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ART. I.—ON EUPATORIUM PERFOLIATUM.

By R. EGLESFELD GRIFFITH, M. D.

Nat. Ord. COMPOSITÆ. *Sub. Ord.* Eupatoriinæ.

Sex. Syst. SYNGENESIA ÆQUALIS.

EUPATORIUM. *Calyx* simple or imbricated, oblong. *Style* long and semi-bifid. *Receptacle* naked. *Pappus* pilose, or more commonly scabrous. *Seed* smooth and glandular, quinquestriate.—*Nuttall*.

E. perfoliatum. *Stem* villous. *Leaves* connate-perfoliate, oblong, becoming gradually narrower; serrate, rugose, tomentose beneath.—*Beck*.

Synon. *Eupatorium Virginianum*, *salviæ foliis*. Plukenet, Alm. 140.

E. foliis connatis tomentosis. Cutler, 478.

E. connatum. Michaux, Fl. Am. 2, 99.

E. perfoliatum. Lin. Sp. Pl. 1174. Willdenow, Sp. Pl. 1761.

Pursh, Fl. Am. Sep. 2. 516. Nuttall, Gen. Am. Pl. 2, 135.

Barton, Comp. Fl. Phil. 2. 101. Beck, Bot. North. and

Middle States, 198. &c. &c.

Icon. Pluk. Alm. t. 87, f. 6. Bigelow, Am. Med. Bot. t. ii. Barton, Veg. Mat. Med. U. S. t. 37.

Common Names. Bone set. Thorough wort. Indian Sage. Ague weed.

Fever wort. Cross wort. Vegetable antimony &c. &c.

Pharm. *Eupatorium perfoliatum*. U. S.

Officinal. The whole plant.

Description.—Root horizontal, crooked, furnished with few fibres, perennial. Stem erect, round, hairy, simple at the base and trichotomously branched above; from two to four feet

high, generally of a grayish green colour. The leaves are opposite, decussating each other at regular distances, usually in pairs, but sometimes in threes, connate, perfoliate, broad at their base and gradually tapering to a sharp point. They are narrow, oblong, serrate, scabrous above and tomentose beneath, and like the stem, of a grayish-green colour. The upper leaves on the main stem, and most of those on the branches, are merely sessile, not being united at base. Flowers in a dense depressed corymb, formed of smaller ones; peduncles short and hairy. The calyx is imbricated and hirsute, the scales lanceolated and acute; each calyx includes from twelve to fifteen florets, which are tubulous, white and divided into five segments. The anthers are of a dark blue or black colour; filaments five, united in a tube. The seeds are black, prismatic, and acute at base, on a naked receptacle. Pappus furnished with scabrous hairs.

There are several varieties distinguished by the form of the leaves, the most striking of which is the *E. perfoliatum trifoliatum*, in which the leaves instead of being united in pairs are joined in threes; this variety is far from uncommon in the neighbourhood of Philadelphia, and in some localities is more plentiful than any other. The inflorescence of this variety is also in less dense corymbs.

Habitat.—The thorough wort is exclusively an inhabitant of North America, and is abundant in low grounds and on the margins of streams in every part of this extensive continent. It sometimes occurs in the greatest profusion, covering whole acres of ground. It flowers in the month of August, continuing in bloom until late in October.

Bot. Hist.—The genus *Eupatorium* derives its name from Mithridates Eupator, who is said to have successfully employed one of the species as an antidote against certain poisons. It is very extensive, containing nearly one hundred species, of which Pursh describes twenty-seven as natives of the United States, and although many of these are mere varieties, subsequent discoveries have shown that at least thirty species are indigenous; the remainder of the genus is pecu-

liar to other parts of the American continent, with the exception of a few species found in Europe and Asia.

Med. Hist.—The thorough wort appears to have been known to the aborigines, and to have been highly esteemed for its febrifuge properties; from them the early settlers in this country derived their knowledge of its virtues, and it became a favourite remedy in domestic practice, long before it attracted the attention of medical men. In consequence, however, of some experiments made with it in a variety of febrile affections, it gradually assumed the rank to which it was justly entitled and now recognised by all our Pharmacopœias and Dispensatories.

Med. properties and uses.—Every part of the *E. perfoliatum* is strongly though not disagreeably bitter. It has been employed to fulfil a variety of indications, as it is a tonic, a diaphoretic, or an emetic, according to the mode in which it is administered. Besides these properties, many others have been attributed to it by various writers, but apparently without foundation. In fact, if we were to credit one half that has been advanced respecting the curative powers of this vegetable, it would richly deserve the title of a universal panacea. Such, however, is not the case, and although it is indubitably a highly important article when properly administered, it is by no means deserving of the eulogies that have been so lavishly and injudiciously bestowed upon it.

As an emetic it is given in a warm decoction, and is considered by Dr. W. Ives as valuable in the early stage of autumnal fevers; it is, however, uncertain in its operation on the stomach, and perhaps scarcely is deserving of more attention in this respect than the decoction of chamomile, or other teas of a similar nature. In large doses it is also said to act on the bowels. Dr. Thacher states that it "has long been esteemed as an efficacious remedy in bilious colic accompanied by obstinate constipation," in the dose of a tea cupful every half hour, until it produce a cathartic effect. Here likewise we are somewhat sceptical, and feel inclined to believe that almost every mild decoction taken to this extent would be equally efficacious.

As a diaphoretic, however, we have ample testimony of its

powers, particularly in catarrhal affections. Dr. Anderson of New York, who made it the subject of his inaugural thesis, speaks of it in high terms in the various forms of intermittent fever. In his favourable opinion of the diaphoretic powers of the Eupatorium, Dr. Anderson is fully sustained by the testimony of numbers of distinguished practitioners. From an extensive use of it for many years, we have been led to conclude that although it is an exceedingly valuable auxiliary in the treatment of those complaints, it is not deserving of the high encomiums that have been bestowed upon it, and that it should not be relied upon to the exclusion of other and more effectual articles.

As a tonic, it is deserving of attention, and is well suited to those cases of dyspepsia and general debility which require the exhibition of the simple bitters. When administered with a view to its tonic powers, it should be given in powder or in cold infusion.

The thorough wort has also been highly praised in the treatment of certain cutaneous affections, but more evidence is wanting on this subject. Dr. William P. C. Barton, who gave it a trial in some cases of obstinate eruptions, found it wholly inefficacious. Dr. Zollickoffer, however, states that in *Tinea capitis* he has been eminently successful, by using it in conjunction with the *potass. sup. tart.*

Pharmaceutical preparations and mode of administration.—When administered with a view to its tonic effect, as has been already observed, it is to be given in substance in doses of from ten to twenty grains, or in cold infusion in doses of two or three ounces. The Pharmacopœia of the United States recognises but one officinal preparation, the infusion, which it directs to be made with an ounce of the herb to the pint of boiling water. According to Dr. Zollickoffer, when given in cases of *Tinea capitis*, the following formula is the best.

R Pulv. fol. Eupat. perfol. $\overline{3}$ ss.
Pulv. cremor tart. $\overline{5}$ i.

Mix and divide into eight powders, one of which may be taken in the morning, noon and at night, and continued until

the disease is removed. In cases of children, who are generally averse to taking the above preparation, he recommends the following:—

R Fol. Eupat. perfol.	$\frac{z}{3}$ i.
Cremor tart.	$\frac{z}{3}$ i.
Aqua bulient	$\frac{z}{3}$ viii.

This preparation is to be permitted to cool, and a sufficient quantity of loaf sugar added to bring it to the consistence of a syrup, by boiling for ten minutes. The dose is two tea spoonfuls, three or four times a day.

Analysis.—No analysis of this plant has been made since the improvements in the processes for the examination of organic substances have taken place. Dr. Bigelow, however, has detailed the results of an examination of it, which is satisfactory as far as it goes. He says the flowers and leaves abound in a bitter extractive matter, which appears to constitute the remedial agent in the plant. This substance is soluble in water and alcohol. It forms copious precipitates with many of the metallic salts. Sulphuric and hydrochloric acids cause a slight precipitate from the aqueous decoction; chlorine, a more copious one; the nitric gives no precipitate, but changes the colour to a red. Tannin exists very sparingly. Sulphate of iron gave a dark green precipitate, which subsided in a short time. On distillation, water came over, very slightly affected with the sensible qualities of the plant, and not alterable by sulphate of iron.

Some difference of opinion has existed among the advocates of the *Eupatorium*, which portion of the plant was to be used; Dr. Anderson concluding from his experiments, that the active properties resided in the greatest quantity in the leaves; in this opinion he is upheld by Dr. Chapman and others, but more extended observations have shown that every part of the plant may be advantageously employed.

All the species of *Eupatorium* appear to be endowed with medicinal qualities in a greater or less degree, and some of them have attained no little celebrity as antidotes against the bite of venomous reptiles.

E. cannabinum, a native of Europe, was at one time in

high repute as a deobstruent; but the recent experiments of Deslongchamps and others show that its therapeutic powers have been much overrated.

E. Aya pana, a native of Brazil, was also considered entitled to a conspicuous rank as a universal panacea, and alexipharmic. A careful examination and trial of its reputed powers has, however, fully proved that, like many other equally vaunted articles, it was comparatively speaking, inert.

In the United States, also, there are several species which require notice, more especially the *E. teucrifolium*, or wild hoarhound. Dr. Jones of Georgia says that this plant "seems an excellent substitute for the Peruvian bark; indeed, among the planters on, or near the seaboard, it supersedes the use of the bark in the cure of fevers." He also remarks, "it is tonic, diaphoretic, diuretic, and mildly cathartic, and does not oppress the stomach as Peruvian bark is apt to do." The dose is one ounce of the leaves infused in a quart of water, which may be taken daily in doses of from two to four ounces every hour or two.

It is probable that most of our native species might be used as substitutes for the *E. perfoliatum*, more especially the *E. purpureum* and *E. maculatum*.

ART. II.—NOTE ON "PREPARED TUTTY."

BY WM. HODGSON, JR.

As the impure oxide of zinc, long known under the name of *Lapis Tutia*, or tutty, still continues to be occasionally used, the following remarks on the article generally sold in this market under that name, may not be without value.

Having occasion to-day to purchase the article, I was struck with its appearance and its want of weight, and on looking at it closely I became convinced that it was not genuine tutty. On breaking the lumps, which were very light, soft and friable, I found that they were composed of small specks of a black and a white substance, interspersed in a light gray or lead coloured mass. There was, moreover, a very percep-

tible odour of lampblack about the broken pieces. I treated a portion of them with dilute sulphuric acid, which occasioned a copious effervescence, and would have dissolved the oxide of zinc, had any been present. The liquid was filtered; and in order to ascertain the presence of zinc, I tested separate portions of it with the following solutions:—

Ferrocyanate of potassa, added, produced a bluish milkiness. Hydriodate of potassa gave no precipitate, but the mixture became yellow. Pure potassa produced a very slight brownish white flocculence. Hydrosulphate of potassa, a white precipitate. Tincture of galls gave no change. I inferred from some of these results that the liquid contained no zinc; but to satisfy myself more completely, I evaporated a portion to crystallization and obtained only a very small quantity of fine silky and extremely minute crystals, which were easily recognized as sulphate of lime, and which were insoluble in cold water. It was therefore plain that the liquid contained no sulphate of zinc, and consequently that the substance under examination also contained none of the oxide of zinc.

On the admixture of the dilute sulphuric acid, the peculiar odour of lampblack had become much more apparent than before. I had now no doubt that the article was a mixture of lampblack and prepared chalk. Two drachms were treated with dilute muriatic acid, till effervescence ceased, and the solution was then filtered. What remained on the filter was chiefly and unquestionably lampblack, and weighed, when dry, six grains.

The filtered solution was treated with a solution of bicarbonate of potassa, which threw down most of the lime as a carbonate. This when dried weighed one drachm and a half, leaving the remainder dissolved in the water along with the carbonic acid, and muriate of potassa. By treating this with oxalic acid I obtained a further precipitate of twenty grains of oxalate of lime, equivalent to about fourteen of carbonate, making the loss on the operation ten grains; which may be accounted for by the substance being somewhat damp and the process conducted in haste.

I may here observe, that so far as I have been able to ascertain, this article is the only one to be found in our market under the name of prepared tutty. Its colour is entirely different from the article generally found in the British market, which is of a dull brown. Its weight also as above stated, is far inferior to that of the genuine tutty, which also, is in drops or irregular cones, but much more compact. The only authors whom I have found to describe it as of an ash gray and bluish colour, are Bussy and Boutron Charlard, in their treatise on the Falsification of Drugs. All the other books which I have consulted describe it as of a brown colour. I am told that the article now noticed is imported both from Germany and France; and it is possible that these authors have taken it for the real tutty.

Philadelphia, 1st mo. 27, 1834.

ART. IV.—ANALYSIS OF THE BARK OF THE PRUNUS
VIRGINIANA.—BY STEPHEN PROCTOR.

(Extract from Thesis.)

THE bark of the wild cherry tree as found in the shops, is usually in pieces from two to six inches in length, of a cinnamon colour, more or less curved laterally, the pieces from the smaller roots being in some instances completely quilled, brittle, and of easy pulverisation, presenting a rough, splintery fracture, of a lighter colour than the external surface. The dry bark has but little smell, but when in the fresh state or in decoction it emits an odour like that of bitter almonds. It has a bitter, astringent, aromatic taste, and imparts its virtues to water, and to alcohol. The infusion, which is officinal in the United States Pharmacopœia, is made by macerating half an ounce of the bark in a pint of cold water for twelve hours. This is decidedly the best form for the administration of this remedy, as it possesses all the sensible properties of the bark in perfection, which is not the case with either the decoction, or the tincture. The decoction if the boiling is long continued, possesses none of the properties of the

bark, except its astringency; like the decoction of cinchona it becomes turbid on cooling, in consequence of the insolubility of the compound formed by the tannin and starch which it contains. The tincture is of a beautiful red colour, and has in a small degree the odour and taste of the bark; it is however never prescribed.

The importance of this article, as a medicine, as well as the length of time it has been in use, would induce the expectation of a more satisfactory chemical history than we find in medical or pharmaceutical records. Its peculiar action when taken into the system, has been attributed by most authors who have written on the subject, to the presence of hydrocyanic acid. The existence of this powerful agent in this remedy, was inferred from the close analogy which its sensible properties bear to those of the bitter almond, cherry, laurel, and other plants, which have long been known to contain it. This inference though plausible, has not, I believe, been demonstrated by experiment.

The following analysis was made with a view of ascertaining the actual constituents of this bark; in making it superior specimens of the dry bark were used, it being impossible to obtain it in the fresh state, at the late season at which the subject was taken up.

Experiment 1. The decoction decolourised by boiling with animal charcoal, strikes a deep blue colour with tincture of iodine, and is precipitated of a dirty white colour by subacetate of lead.

Experiment 2. Upon the addition of water to the tincture concentrated by evaporation, it threw down a curdy precipitate of a light brown colour, which upon examination proved to be resin.

Experiment 3. The infusion and decoction precipitate gelatine; they also cause a precipitate of a dark olive green colour in a solution of sulphate of iron.

Experiment 4. A saturated decoction of the bark was made, and digested with hydrate of alumina for twenty-four hours, afterwards filtered and concentrated by evaporation to one half; the concentrated solution was nearly colourless,

had a slightly sour and astringent taste, and turned the blue colour of litmus to a red ; it also caused a dark green precipitate in a solution of sulphate of iron, and one of a brownish yellow in lime water, but did not precipitate gelatine.

Experiment 5. Digested 480 grains of the powdered bark in sulphuric ether for twenty four hours ; the ether was then decanted and evaporated ; there remained a white fatty matter which was insoluble in alcohol, and left a greasy stain upon paper.

Experiment 6. Distilled four ounces of the bark coarsely powdered with one quart of water, in a suitable retort, (heated by means of a sand bath,) till the water came over inodorous ; the product of the distillation had a milky appearance, and the odour of bitter almonds ; the exhausted residue was then removed from the retort, and replaced by four ounces more of the powdered bark, upon which the distilled liquor was returned and the distillation repeated ; this process was continued until one pound of the bark had been consumed ; during the latter stage of the process globules of oil were observed floating on the surface of the liquor in the receiver ; they however, from their superior specific gravity soon fell to the bottom. After the distillation was completed the oil was separated and preserved in a vial.

Experiment 7. After the separation of the volatile oil, a few drops of a solution of sulphate of copper were added to a portion of the distilled liquor, and the peroxide of copper precipitated by caustic potassa ; muriatic acid was then added which dissolved the peroxide of copper, leaving the solution of a milky appearance in consequence of the cyanuret of copper diffused through it.

Experiment 8. Repeated the preceding experiment substituting sulphate of iron, for the sulphate of copper, upon the addition of the muriatic acid, the colour of the solution changed to the characteristic deep blue, of the ferrocyanate of iron.

Experiment 9. The remainder of the liquor obtained by distillation, was saturated with peroxide of mercury, filtered and evaporated to dryness by the aid of a water bath ; there

remained in the vessel a white mass crystallized in quadrangular prisms, the crystals were then reduced to powder, dried at the temperature of 212° Fahrenheit, and introduced into a dry glass tube bent rectangularly, and closed at one end; the open extremity was then heated in the flame of a blow-pipe and drawn out so as to form a capillary orifice, after which the matter contained in the closed end of the tube was decomposed by heat, and a colourless gas came over, which burnt with a beautiful purple flame characteristic of cyanogen; there remained in the tube metallic mercury and a small portion of carbonaceous matter.

Experiment 10. Submitted a portion of the crystalline matter obtained as in the last experiment, to the process laid down in the United States Pharmacopœia, for obtaining hydrocyanic acid; the product obtained had all the properties of a weak solution of that acid.

Experiment 11. Incinerated 1000 grains of the bark, and obtained a residue weighing thirty grains; this residue was submitted to the action of boiling water, which dissolved three grains. The solution after being concentrated by evaporation, had an alkaline taste, effervesced strongly with acids, and restored the blue colour to litmus, reddened by an acid: it was then neutralized with nitric acid, and upon evaporation yielded crystals of nitrate of potassa.

Experiment 12. The insoluble residue of the preceding experiment was dissolved by nitric acid, (with the exception of a minute portion of carbonaceous matter,) with violent effervescence; the colourless solution thus obtained threw down a white precipitate on the addition of oxalate of ammonia, and a deep blue one with ferrocyanate of potassa.

It may be inferred from the foregoing experiments, that the principal constituents of the bark of the *Prunus Virginiana*, are as follows, viz:—1. Starch. 2. Resin. 3. Tannin. 4. Gallic Acid. 5. Fatty Matter. 6. Lignin. 7. Red colouring matter. 8. Volatile Oil. 9. Hydrocyanic Acid. 10. Salts of lime and potassa. 11. Iron.

The red colouring matter is soluble in alcohol and in

water, but insoluble in ether; its colour is rendered much deeper by the addition of an alkali.

The volatile oil of the wild cherry bark is of a light straw colour, soluble in alcohol and in ether, and is extremely analogous in its properties to the essential oil of bitter almonds; it acts with equal energy on the animal economy, and might be used in medicine for the same purposes: in the dose of two drops it proved fatal to a full grown cat in less than five minutes.

Five hundred grains of the bark afforded two hundred and ten grains of watery extract, of a dark red colour, and of a sweetish bitter and extremely astringent taste. The same quantity of bark yielded one hundred and eighty grains of alcoholic extract, of a lighter colour, more bitter, but less astringent in its taste than the extract obtained by water.

The late Dr. Conwell, in his Dissertation on Vegetable Chemistry, mentions that he has obtained from the bark of the wild cherry tree an alkaline principle to which he has given the name of *cerasia*. To obtain it he evaporated a decoction of the bark, acidulated with sulphuric acid, until sufficiently concentrated, and then obtained the sulphate of the alkali in crystals by refrigeration. The salt thus obtained appears to be sulphate of lime; it is not decomposed at a red heat, and when in solution throws down dense white precipitates, with oxalate of ammonia and muriate of baryta.

ART IV.—NOTE ON THE MANUFACTURE OF ICHTHYOCOLLA
IN THE UNITED STATES. BY J. V. C. SMITH, M. D.

(Extract from a letter to D. B. Smith.)

DEAR SIR—Since writing you, several weeks ago, I have been procuring information upon the subject of isinglass, with reference to sending the results to Philadelphia.

During the Revolutionary war the industrious females of Gloucester, a small fishing town on the island of Martha's Vineyard, supplied large quantities of cloth, of various kinds,

of their own manufacture, for the families of the then less enterprising towns of Salem, Beverly, and the adjacent settlements. The sizing used in stiffening this cloth was particularly admired, being made by boiling the air-bladders of the *hake*, in fresh water.

As the business of fishing kept gradually increasing from that eventful period, and the town of Gloucester in time became distinguished in this way, it was an object to economize, and to save every part of the fish.

The manufacture of isinglass was thought of; but the quality of that made from the sounds of cod, haddock and the like, which were, till within a few years, considered the most common fish, was not satisfactory, and the manufacture, therefore, was nearly abandoned. About this time, some aged people recollected the *Sandy-bay sizing*, (a part of the town of Gloucester, where the cloth was made,) which was the most welcome intelligence to those who had abandoned their works. Upon a careful course of experiments, it was satisfactorily ascertained that the sounds of the *hake*, *GADUS merluccius*, yielded the very best and purest kind of isinglass; it is certainly equal to that made from the sturgeon.

The air-bladder of this fish is much larger than any of the gadus family, thicker, and more detached from the neighbouring organs. When the fish is opened, it is easily peeled out whole, which cannot be done in the cod; and being thrown into a tub, very little is to be done with it: perhaps to be washed in clean water is all that is necessary, and then dried in the sun on the riddles, or fish-flakes, made of small underbrush. When partially dry, each piece is pressed between wooden rollers, where it is spread into a broad, thin sheet.

The long strips of isinglass, rolled up like a ribbon, are the intestines of the cod-fish, *GADUS morrhua*.

I have the foregoing account from an aged gentleman, who has witnessed the processes which have been detailed. That a very good isinglass may be made from the stomach of this family of fishes, is very certain; and I am not sure that it might not be made a profitable employment, the article being called *fish glue*, to be used by cabinet makers, colourers &c.

Quarantine Ground, Port of Boston, Sept. 2, 1833.

ART. V.—CN CIMICIFUGA RACEMOSA. BY JOHN H. TILGHMAN.

(Extract from Thesis.)

THE root, which is the officinal portion of the plant, consists of a short, knotty, dark brown or blackish caudex, very rough and jagged, which sends off numerous long, slender radicles, from the size of a needle to that of a crow quill, generally of a much darker hue than the caudex, wrinkled or shrunk on their exterior, and varying in length from two or three to as much as six or eight inches; when broken, they present a white, starchy interior, which in the dried root becomes somewhat ligneous; the fracture is short, and presents on the broken surface three distinct layers; the interior white, somewhat like pith, but which, when separated from the outer coating, is tough, flexible and composed of fibres running its whole length. Between this and the epidermis is a greenish, spongy portion, which in the large roots constitutes two thirds of their bulk, and possesses, in common with other parts of the root, a peculiar earthy smell.

The taste of the fresh root is bitter, nauseous and astringent; that of the dried at first mucilaginous and earthy, and after being retained a few moments in the mouth, producing on the palate and throat a very bitter and disagreeable taste. Much, however, of the peculiar taste and smell of the root as found in the shops, may be said to depend on the mode and time of collecting, as well as the manner of drying and preserving it. Several different samples of the root, which I had an opportunity of examining, possessed in very variable degrees, the peculiar flavour and taste which ought to belong to it when of good quality, arising, no doubt, from some one or perhaps all of the above mentioned causes. The apothecary must therefore be unavoidably subjected to such inconveniences in many instances, unless he can devote a portion of his own time to the collection of the different indigenous medical productions.

The root, though very generally kept in the shops, cannot be said to rank among those indigenous remedies in common use

having passed gradually out of the hands of the physician into the list of domestic medicines or those of empirical use. Those authors who in writing of the medical properties of the *Cimicifuga* have drawn the line of distinction between it and the *Actæa* make no mention of the latter plant having gained the reputation of a remedial agent, from which the deduction may be drawn that all that has been said by writers who have not made the distinction respecting the medical uses of the *actæa*, may in common justice be referred to the *cimicifuga*. This, however, is not intended to be considered a positive assertion that the *actæa* does not possess medical properties, but is merely an inference drawn from the fact of the two medicines having been so often confounded, and from its being known that the *cimicifuga* does possess such properties.

We might suppose, though with what propriety I will not undertake to assert, that one of the evidences of its not having deservedly gained the reputation, formerly attached to it, is the fact of our having been permitted to remain till a very late period so much in the dark as to the nature and extent of its proximate constituents. So far as our knowledge extends, no analysis of its principles was made known to the world previous to that of Dr. Mears in 1827. There are individuals who assert their having obtained a crystalline matter from it, and who seem content with the mere fact of having isolated what they consider its active principle, without ever publishing for the benefit of the scientific community the process pursued by them for its extraction, much less an elaborate and satisfactory account of its chemical properties. Surely they can have a very limited desire for the progress of that branch of science with which their interests are so closely allied, who would for a moment withhold any information that would tend to cultivate a spirit of research among the pharmaceutical profession; however small the amount of information communicated might be, it would still constitute an accession to the general mass, and as such would not fail to produce its good effects. Such a desire has induced me to venture the result of a few experiments, made in a rough

way, and not with that strict regard to precision or accuracy of manipulation that ought to be the aim of the student who is not already initiated into the labyrinths of analytical research; and for the contracted nature and imperfections of which I must beg to be considered as an apology, the very late hour at which the subject was unavoidably taken up.

Before proceeding to the enumeration of them, it must here be premised that the few that have been made have been confined exclusively to the dried root, as it was altogether impracticable, under existing circumstances, to obtain it in a fresh state; care, however, was taken in selecting roots that had been well preserved, and collected during last autumn.

Two ounces of the powdered root were digested in f ℥iij. of sulphuric ether several days, filtered and by evaporation deposited on the side of the vessel a fatty matter, insoluble in water, soluble in cold alcohol, and leaving a greasy stain upon paper; beside this a soft extract of a greenish colour was left, possessing the bitterness of the plant, and a peculiar heavy, somewhat narcotic odour; this was treated with boiling alcohol and animal charcoal previously purified by muriatic acid, filtered, and by evaporation deposited the fatty matter and extract in very much the same form. A strong decoction was made by boiling four ounces of the root in two pints of water down to one; this when filtered threw down a copious precipitate on the addition of pure alcohol which was gum; liquor plumb. subacetat. also caused a precipitate consisting of gum, colouring matter and other foreign substances. Treated the root that had been used for making a tincture with boiling water an hour, filtered and added tincture of iodine, which caused an abundant precipitate of a deep blue colour indicating the presence of starch.

A concentrated tincture of the root yielded by evaporation a dark brown extract insoluble in water, but soluble in alcohol and ether, and possessing the properties of resin; the tincture was precipitated immediately and very abundantly on the addition of water.

The decoction was precipitated by the carbonates of potassa and ammonia, and by alumina; also, by a solution of

gelatine yellowish and sulphate of iron black, from which the presence of tannin may be expected.

A strong tincture was precipitated by ammonia dark brown; this was collected and treated with alcohol and animal charcoal, filtered and evaporated, and deposited a crystalline matter of a warm, somewhat peppery bitter taste, and a dark brown transparent matter which remained fluid while hot, but on cooling solidified to the consistence of wax, which it resembled in all its properties.

Digested a portion of the decoction with hydrate of alumina for three days, filtered and evaporated to one half. The solution reddened litmus paper speedily; possessed a slightly bitter and very astringent taste, was precipitated by subacetate of lead white, and very abundantly; dark green approaching to black by sulphate of iron; also, by lime water and the carbonate of potassa and soda; but was not disturbed by a solution of gelatine, from which we may suspect the presence of gallic acid, as tannin would cause a precipitate with the latter reagent.

The solution containing the gallic acid yielded, by evaporation, an extract of the consistence of thick honey, which was insoluble in alcohol and ether, but readily soluble in cold water, and possessing a decidedly sweet taste; from which, and from the fact that all the decoctions when the least concentrated, had this sweetness, we may infer the presence of sugar in some way combined.

Submitted four ounces of the bruised root to the action of one quart of water for several days, after which chloride of sodium was added, and the whole submitted to distillation by means of a sand bath, as long as any fluid passed over; this was thrown back on a fresh portion of the root, and distilled as before. In this manner the cohobation was repeated several times; the water that passed over was rendered quite opaque, or milky; was impregnated with a peculiar heavy, narcotic, disagreeable odour, but possessing no sensible taste; after the liquid had remained at rest several days, numerous minute particles of a shining appearance were seen floating on the surface, supposed to be oil, but so very minute as to

prevent an examination of their properties being made. By evaporating a tincture of the root to a certain point, distinct globules of oil may be seen floating near the surface of the liquid, of a brown colour, and having a bitter taste and slight odour.

There are two distinct colouring principles in this root; one very black, which is taken up very freely by water, more so when slightly acidulated, but very sparingly soluble in alcohol or ether; the other, insoluble in water, sparingly in alcohol, but imparting a rich green colour to ether when digested with it.

Boiled two pounds of bruised root in *cong.* 1ss.: water, acidulated with $\frac{3}{4}$ 1ss. sulphuric acid, an hour; strained the decoction, and added lime to saturation, collected the precipitate and submitted the residue to the action of boiling alcohol, which deposited, by evaporation, a green, somewhat resinous matter, of a bitter, nauseous taste. The precipitate by lime was treated by boiling water and filtered, and yielded, by evaporation, crystals in very fine transparent needles, gritty under the teeth, and having no perceptible taste; these were insoluble in alcohol 40° Baumé, or ether; very slightly so, if at all, in boiling alcohol, but very soluble in dilute acetic acid, giving rise to a slight effervescence. These, which at one time might have been classed along with *cerasia*, *mahogonia* &c. as a vegetable alkali, proved by making an acid solution of them, and adding oxalate of ammonia to the lime.

A saturated tincture which had digested during several months, was placed in a retort, and by a water bath two-thirds of the alcohol was distilled over, which retained the peculiar odour of the plant, but was not bitter; yielded no residue by evaporation, and was not precipitated by any of the ordinary reagents; toward the close of the distillation a few globules of a dark brown matter, were seen floating near the surface of the liquid, which, from general appearance, I took to be oil; but it was in too small a quantity to admit of an examination of its properties; a considerable proportion of a shining extract, having a nauseous, disagreeable, though not very bitter taste, remained in the retort, freely

soluble in alcohol, less so in ether, and became white and milky on the addition of water.

One thousand grains of the root yielded, by incineration, seventy-nine grains of ashes; by treating these with boiling water and filtering, a strong alkaline solution was obtained, which changed turmeric deep brown, and restored the colour of litmus previously reddened by an acid. Considerable effervescence took place on the addition of an acid; the solution formed crystals of bitartrate of potassa on adding tartaric acid in excess, and was precipitated by muriate of baryta.

Another portion of the ashes was treated with boiling dilute muriatic acid, filtered, and on adding oxalate of ammonia, a dense white cloud was produced, supposed to be lime.

Treated the ashes with concentrated sulphuric acid till effervescence ceased, and added water to dilute the solution. On adding a few drops of a solution of ferrocyanate of potassa, a deep blue precipitate was thrown down, as a ferrocyanate of iron. Neither infusion nor tincture of galls gave indication of the presence of iron in this solution, owing perhaps to its being in the state of peroxide, as Dr. Turner says the iron must be as protoxide, or what is better a mixture of protoxide and peroxide, to give indications of its presence with this test; the solution, however, threw down a blood red precipitate on adding sulphocyanate of potassa, thereby denoting to a certainty the presence of iron. By treating the ashes with boiling water acidulated with sulphuric acid, and filtering the solution, it deposits by slow evaporation a large quantity of transparent needle shaped crystals, possessing an intensely sharp acid taste, owing in some measure to an excess of acid, sparingly soluble in water, precipitated by the carbonated alkalies and oxalate of ammonia. The mother water being separated from these, precipitated by carbonate of soda, collected and dried, gave a white, soft powder, almost insoluble in water, but readily dissolved on adding an acid, and giving rise to effervescence; the aqueous solution possessed alkaline properties, changing turmeric to brown, was precipitated as a hydrate by caustic potassa and ammo-

nia and by carbonated alkalies. On adding phosphate of soda to the solution, no precipitate immediately falls; but on adding ammonia in small quantity a copious white precipitate is thrown down, which Professor Brande calls a triple ammonio-magnesian phosphate.

From the result of these few experiments we may venture the following enumeration of the constituents of *cimicifuga* :— 1st. Fatty matter. 2d. Gum. 3d. Starch. 4th. Resin. 5th. Tannin. 6th. Wax. 7th. Gallic acid. 8th. Sugar. 9th. An oil. 10th. Black colouring matter. 11th. A green colouring matter. 12th. Lignin, to which may be added salts of lime, iron, magnesia and potassa. These experiments have not led me to any decided conclusion as to the nature of the active principle of *cimicifuga*. The peculiar bitterness and nauseating properties of the plant seemed more fully developed in the ethereal extract than in any other form that came under my observation.

The root was treated by the process for obtaining sulphate of quinine, but with no satisfactory result; as also by several other processes, but which as they threw no light on the subject, are not considered worth mentioning in this place.

Having understood that a druggist in this city had obtained from the *cimicifuga* a crystalline matter which he considered to be its active principle, I felt some desire to be acquainted with its properties, and for that purpose a small quantity was procured, and submitted to what little examination my time would allow being made.

It was in a state of coarse granular, rather than crystalline powder, of a white colour, tasteless and inodorous, having rather a gritty feel under the teeth; insoluble, or to a very slight degree, in water, alcohol, or ether, soluble in dilute nitric and muriatic acids, from which it is precipitated by ammonia, very sparingly soluble in dilute sulphuric acid, and is thrown down immediately on adding a few drops of ammonia. The concentrated acids effected no change in its appearance; and when treated with boiling water and the solution filtered, an opaque, whitish precipitate is formed on adding oxalate of ammonia in small quantity. From the re-

sult of the experiments above mentioned, we may conclude that a considerable per cent. of lime entered into its composition.

ART. VI.—MEDICO-BOTANICAL NOTICES. No. 2.

Spikenard.—It is evident, from the writings of Pliny and other ancient authors on natural history and materia medica, that the name of *Nardus* was indiscriminately applied to a variety of aromatic plants, and hence the utmost difficulty has attended all attempts to ascertain what vegetable furnished the true oil of spike. Sir William Jones published in the Asiatic researches an account of a plant called by the Hindoos, *Jatamansi*, which, from the description he received of it, he considered to be a species of *Valeriana*, and to afford the true spikenard of the ancients. His conjecture as to the genus to which it belonged, was confirmed by Roxburgh, who published a figure and description of it in the same work, and which, it should be noticed, agree very well with the representation by Garcias of this drug. This opinion has been adopted by most of the late writers on the materia medica without scruple. Ainslee, however, in common with several other eminent authorities, doubts the correctness of ascribing the Spikenard to the Valerian, and seems to think that it is derived from the *Cyperus stoloniferus*, ROTTLER, and Sir William Blane ascribes it to the *Andropogon parancuia*, the essential oil of which is much used in the east as a stimulant. Notwithstanding the arguments adduced by Sir William Jones, (Asiatic Researches, iv. 109,) this opinion, or at least that the Spikenard of the ancients was the product of a gramineous plant, appears to be sustained by the best proofs, as may be seen in the *Hierobotanicon* of Celsius. G.

Nutmegs.—An importation of nutmegs has lately been made into Philadelphia, of a kind which are but rarely seen in our markets. They are still enclosed in their shell, which is oblong, about the size of a date, smooth, brown and shining;

on breaking this shell, the nutmeg is seen covered with a yellowish brown epidermis, somewhat resembling mace, but tasteless; the nut is much less marked with furrows than the true nutmeg, has less specific gravity, with fewer but darker coloured veins; it also appears to be inferior in strength to the true nutmeg, if fresh and of good quality, but is fully equal to those generally found in the market.

They were at first thought to be the product of the *M. tomentosa*, Willd., *M. Malabarica*, Lamark, *Nux maceis mas*, Rumphius, v. ii. 24. t. 25, Celsius *Exot.* 14, which is a native of Banda, Amboyna &c., but it does not agree with the description given by authors of the fruit of this species in many particulars; this is described by Merat and De Lens, in their admirable dictionary, as follows: "Fruit larger than the true nutmeg, oblong, lighter, less aromatic, with red veins which are larger and concentric, not furrowed on their external surface, but smooth. The shell is very shining, brown, with more marked furrows, though fewer in number than in the true nutmeg." There is no doubt that the article in question is one of the species which have been confounded under the name of *male nutmegs*, and may be the fruit of the *M. Philipensis* of Lamark, which bears an oblong nut, and is given by Sir James E. Smith as the same as the *M. tomentosa*, but we think erroneously. G.

Maclura aurantiaca, Bow wood.—Dr. Torrey in his description of plants collected during a journey to the Rocky mountains, by D. E. James, has followed Kunth and Sprengel, in considering the *Maclura* as identical with the *Broussonetia tinctoria*, or Fustic of the West Indies. We have been led to doubt the suggestion of this able botanist on many accounts.

Dr. James describes the *Maclura* as follows, (Long's Exp. 11. p. 158,) "This tree rises to the height of twenty-five or thirty feet, dividing near the ground into a number of long, slender, and flexuous branches. The wood is of a yellowish colour, uncommonly fine and elastic, affording the material most used for bows by all the savages, from the Mississippi

to the Rocky mountains. The bark, fruit &c., when wounded, discharges a copious milky sap which soon dries in the air, and is afterwards insoluble in water, containing a large quantity of caoutchouc. The leaves are oval and entire, five or six inches long, and from two to three inches broad, smooth and shining on the upper surface. The fruit, in size and external appearance, resembles the largest oranges. It consists of radiating and woody fibres, terminating in a tuberculated and slightly papillose surface. In this fibrous mass, the seeds, which are nearly as large as those of a quince, are disseminated." Nuttall, in his *Genera N. A. Plants*, says that the pulp is nearly as succulent as that of an orange, sweetish and perhaps agreeable when fully ripe. Dr. James, however, thinks that the fruit never becomes pulpy and succulent. The opinion of the latter is probably correct, for those produced at the garden of the Messrs. Landreth, certainly are not edible.

The leaves are petiolated, oval, acuminate, very entire, apex mucronulate, upper surface smooth and shining, petiole and nerves, on the under side, somewhat hirsutely but minutely pubescent. *Nuttall*.

The *Broussonetia tinctoria*, according to the description of Sloane, is a tree of sixty feet high, with oblong, pointed, serrated, rough leaves, cordate at base. The fruit is about the size of a nutmeg, formed like other mulberries, of a greenish colour both within and without; when ripe it is pleasant to the taste, but lusciously sweet. No good figure has ever been given of this tree. From a comparison of specimens in the herbarium of the Academy of Natural Sciences, with those of *Maclura*, the correctness of Sloane's description of the foliage was verified; in fact the most cursory examination of specimens of these two plants would at once satisfy the most sceptical that they are very distinct.

The wood of the *Maclura* is not unlike that of *Fustic*, but is of a richer yellow, and has more specific gravity. The following experiments were made to ascertain its tinctorial properties in comparison with those of *Fustic*.

The wood when rasped was of a rich orange yellow, and

somewhat resembled in odour the common quercitron bark. Its decoction is of a light yellow, inclining to orange. Its alcoholic tincture was much darker, being of a yellowish brown. The taste of the decoction was very slightly bitter and astringent.

It colours cotton and wool of a light yellow, which however is not permanent. If alum be used as a mordant, the colour is brighter and more solid; never, however, equalling that produced by the Fustic.

With the preparations of iron it strikes a dark brown black. The alkalies render the colour of the decoction darker. Gelatine precipitates part of the colouring matter, leaving the decoction of a brighter tint.

On the whole, it is evident that the colouring properties of the *Machura* are inferior to those of Fustic, but at the same time it deserves attention as a yellow dye, and might also be advantageously substituted for Fustic in the preparation of olive and brown colours. G.

ART. VII.—ON BICYANURET OF MERCURY, &c. &c. By

WILLIAM ELLIS.

(Extract from Thesis.)

THE Bicyanuret, more commonly called the Cyanuret or Cyanide of Mercury, having been adopted by the United States and Dublin Pharmacopœias as an officinal salt for the formation of Hydrocyanic Acid; I was induced, from the importance of the latter as a therapeutic agent, and the disparity in the formulæ for obtaining the Cyanide, to make some experiments with a view of ascertaining the most eligible process.

The U. S. formula for obtaining the above salt is,

Red Oxide of Mercury $\bar{\text{z}}\text{ij}$,

Ferrocyanate of Iron $\bar{\text{z}}\text{vj}$,

to be well powdered and thoroughly mixed.

Distilled Water Oij .

Boil in two pints of the water, constantly stirring till the

mixture becomes yellowish. After which filter through paper. Wash the residue in the remainder of the water and filter as before; mix the solutions and evaporate till a pellicle appears, then set aside to crystallize. To purify the crystals dissolve them in distilled water, filter and evaporate the solution and set it aside to crystallize. Using half of the above quantities and proceeding according to the directions, I obtained 3vi. of the salt, 3iv. of it as the product of the first filtration and refrigeration perfectly pure—the rest obtained by careful evaporation was somewhat coloured.

The colour of the mixture after being boiled was of a greenish brown, very much the colour of tartrate of iron. Not of a yellowish colour which it is stated is produced.

The Dublin formula is

Red Oxide of Mercury	3v,
Ferrocyanate of Iron	3vi,
Distilled Water	3xl.

Boil for half an hour constantly stirring. Wash the residue frequently in warm distilled water. Filter the liquors and evaporate them until they furnish crystals by refrigeration. Using half the quantities of this formula, I obtained as the product 3xi of the bicyanuret in regular crystals, but little coloured. The colour of the mixture was of a light brown—the change indicative of the complete decomposition of the ferrocyanate. The Prussian blue of commerce is the kind intended to be used in both these processes. The equivalent quantities for mutual reaction are 216 of red oxide of mercury, and 188 of pure Prussian blue. The Dublin formula approaches these quantities much nearer than the U. States, but as the commercial article of Prussian blue is used, these proportions are not the proper ones for practice.

In the Edinburgh Journal of Science, the quantities given as being the best proportions, are eight parts of pure Prussian blue, finely powdered and well dried, to eleven parts of the red oxide of mercury. But this proportion of the red oxide is unnecessarily large, as the pure Prussian blue is used with it. When used pure an equal weight of the red oxide would

more than be sufficient for decomposition—but for convenience sake, might always be taken, as well as for any economical consideration—being a cheaper preparation than the Prussian blue.

The Dublin formula differs also from that of the United States, in ordering the residue after filtration to be frequently washed with warm distilled water; and this direction though indefinite, might be followed in the U. States process, with advantage. The Paris codex differs from both in this respect—directing the washing to be continued till the water comes off tasteless. As long as the water comes off with the disagreeable metallic taste, which the salt of mercury will give it, crystals may be obtained from it. In these processes the product, when coloured, is owing to the presence of iron; and to free it from this, Berzelius recommends to dissolve it in water, and digest with a small quantity of the red oxide of mercury, which precipitates the oxide of iron; filter the solution, and to saturate it completely, mix with it hydrocyanic acid. Any excess of acid is of course driven off in the evaporation, and the only objection to this is that it requires the previous formation of the acid.

The product of the U. States formula was greater in proportion to the oxide of mercury employed, than that of the Dublin; but an increased proportion of the red oxide in the U. States process would in all cases be found practically advantageous, the purest commercial Prussian blue being used.

According to Chevallier, the most economical method of obtaining the cyanuret of mercury, is by decomposing a persulphate of mercury by the ferrocyanate of potassa, filtering the solution whilst hot in order to separate the iron of the ferrocyanic acid, and crystallizing the cyanuret of mercury by refrigeration. From 100 parts of ferrocyanate of potassa, and 200 of dry persulphate of mercury he obtained 145 of the salt. The salt obtained by this process, is about the same in proportion to the quantities employed, as will hereafter be seen, was obtained by the U. States formula, with some modification of it.

Winkler prepares it by the following process. Mix 15 parts

of ferrocyanate of potassa, with 13 of concentrated sulphuric acid, and 100 parts of water. Distil the mixture to dryness into a receiver containing 30 parts of water. The ferrocyanate is decomposed. Hydrocyanic acid distils over, and sulphate of potassa is formed in the retort. Reserve a portion of the acid, and mix the rest with 16 parts of red oxide of mercury in fine powder. Decant the liquor, and add for the purpose of saturating it, the acid that had been reserved. This process gives 12 parts of the bicyanuret. The product cannot in this instance, be said to be coloured, from the presence of iron, but from the sulphuretted hydrogen formed during the process. If the liquor were not treated with free hydrocyanic acid, after having acted on the red oxide, it might probably contain some of this oxide in excess and when evaporated, would yield instead of the bicyanuret, a peculiar salt composed of this cyanuret and the red oxide which crystallizes in small acicular crystals. Berzelius recommends the above process; and states, that from treating the residue in the retort by water, 5 parts of pure Prussian blue may be obtained.

All the ferrocyanate of potassa, it would hence seem, is not decomposed. The iron of the decomposed portion may be supposed to be brought to the state of peroxide by the water, and the undecomposed ferrocyanic acid to unite with it—forming the ferrocyanate of the peroxide, or the pure Prussian blue.

Using the quantities of the U. States formula, as before stated; boiling the mixture in all the water for half an hour; filtering whilst hot, and washing the residue with distilled water, slightly warmed till it came off tasteless. The product by evaporation was 3x, of the cyanuret in regular crystals. A quantity equal to rather more than one half that obtained by the directions of the formula.

The light brown colour the mixture assumes by boiling, will always be obtained in less than thirty minutes, if at all; but where the ferrocyanate is in excess, this change in its colour is not produced. The light brown colour of the mixture in the Dublin process, was formed in about half the time

ordered for boiling; consequently further heating the mixture is not proper, as it would tend only to decompose, and drive off partly the salt of mercury formed in solution. A better direction would be to continue the heat till the light brown colour appears, or for half an hour.

There are two new combinations of the hydrocyanic and ferrocyanic acids, one of which at least, may hereafter form an important addition to the materia medica;—if the experiments which have been made with them in Europe should be confirmed by the faculty in this country. These are the hydrocyanate and ferrocyanate of quinia. The former is the result of a direct combination of hydrocyanic acid with quinia, and contains 24 grs. of quinia to the ounce of liquid; the dose of which in intermittent fevers, is from ten to twelve drops. Owing however to its great liability to undergo a change; the ferrocyanate has been proposed as a substitute, and it is this latter combination, the introduction of which in this country is entirely new; and which promises to be a valuable remedy in periodical fevers, that is entitled to most consideration.

This salt is prepared according to M. Bertozzi of Cremona, by double decomposition of sulphate of quinia and ferrocyanate of potassa.

The following formula is given by that chemist:

Ferrocyanate of potassa $1\frac{1}{2}$ parts,

Sulphate of quinine 1 part.

Triturate together. Boil the mixture in 7 parts of water; separate by decantation a greenish yellow oleaginous substance; which is to be washed in distilled water, and then dissolved in hot alcohol, filtered and evaporated. The product is a greenish yellow salt—equal to three-fourths of the quinine employed—in confused needle-shaped crystals, of very bitter taste; soluble in cold but more so in boiling alcohol. It is nearly soluble in hot water, which decomposes it into two salts; the one soluble, the other insoluble. Of the result of this decomposition of which no further notice is taken, my time would not permit any investigation. The salt which I obtained by the above process, corresponds with the des-

cription M. Bertozzi gives; but is more highly coloured than some in my possession, prepared by Mr. G. B. Browne, operative chemist of this city; whose opportunities in the laboratory of M. Robiquet of Paris, where they manufactured considerable quantities of it; were such, that he may probably have a superior process for its preparation.

As the rationale of the formation of the bicyanuret of mercury involves a knowledge of the composition of Prussian blue, it must be borne in mind, that this substance consists of two equivalents of hydrocyanic acid, one of cyanuret of iron, and two of peroxide of iron. The two equivalents of hydrocyanic acid, react upon one equivalent of peroxide of mercury, and by a double decomposition, give rise to two equivalents of water, and one equivalent of the bicyanuret; the latter of which remains in solution while the cyanuret and peroxide of iron of the Prussian blue, are left as an insoluble residue. This is the most simple and correct rationale, perhaps, that can be given.

The following is from the Edinburgh Journal of Science, vol. v. The oxygen of the oxide of mercury unites with the iron and hydrogen of the ferrocyanic acid, while the metallic mercury enters into combination with the cyanogen, and the peroxide of iron is left as the insoluble residue.

As the result of my experiments I give the following modified proportions of the U. States formula, as being the most productive of any that can be adopted.

Red oxide of mercury	$\frac{3}{4}$ iv,
Ferrocyanate of iron	$\frac{3}{4}$ vj,
Distilled water	Oij.

Put the oxide of mercury and the ferrocyanate of iron previously powdered and thoroughly mixed together, in a glass vessel and pour upon them the distilled water. Then boil the mixture, constantly stirring for twenty minutes, or till it becomes of a light brown colour—filter through paper—wash the residue with warm distilled water till it comes off tasteless. Filter the liquors, mix and evaporate them until they furnish crystals by refrigeration.

Selected Articles.

ART. VIII.—OBSERVATIONS ON ORGANIC CHEMISTRY, &c.

By J. F. W. JOHNSON, A. M. &c.

Extract.

[THE following observations are extracted from the highly valuable and luminous report made to the British Association for the Improvement of Science, at their second meeting, by Mr. Johnson, from which we have also drawn largely for our miscellaneous department, and regret that our limits preclude the insertion of the whole report.]

Vegetable products. The attention of chemists, long withheld from the department of vegetable chemistry, by the obscurity and difficulty of the subject, has of late years been more earnestly directed to this interesting field. The analytical researches of Gay Lussac and Thenard threw the first distinct light on the nature of vegetable compounds, and gave rise to the first general deductions in regard to their composition. Those of Saussure and of other chemists, whom the apparently simple method of analysis employed by Gay Lussac induced to undertake similar investigations, speedily added to the number of ultimate analyses. But the dissimilar and often contradictory results obtained by different experimenters in analysing the same substance, showed that few of those yet made known could be regarded as any thing more than tolerable approximations. The determinations of Berzelius and Dr. Prout were among the earliest on which confidence could be placed, and have proved almost the only ones which later investigations have not corrected.

In different countries attempts have been made to improve the method of vegetable analyses so as to secure more constant and more exact results. In England, Dr. Prout's apparatus, though less simple than that employed by others, has

in his hands led to results of the greatest precision. In France, Dumas, Pelletier, Henry, Plisson, and others have paid much attention to this subject. In Germany we owe to Liebig and Wœhler many of the best and most important analyses hitherto published on vegetable chemistry.

Another description of labourers also has done much in this field. The remarkable discovery of Serturner, that the opium of commerce contains a vegetable alkali or salt basis, (morphia,) to which its soporific virtues are owing, led the way to a train of vegetable research, from which large accessions of knowledge have been obtained. Pelletier and Caventou had the merit of first following up the investigation, and of making us acquainted with several of the most important vegetable principles hitherto discovered. They have been followed by many others, and with such success that during the fifteen years that have elapsed since Serturner's discovery began to attract the attention of chemists, we have been made acquainted more or less fully with upwards of *thirty* acid, and nearly as many alkaline principles, either existing ready formed in the products of the vegetable kingdom, or produced during the process employed for extracting their active ingredients. Besides these, upwards of fifty other principles have been described, possessing the properties or virtues of the plants from which they are extracted, but exhibiting neither acid nor alkaline properties.

While our knowledge of ultimate principles and their atomic constitution has thus been extending, several interesting theoretical inquiries have been raised, chiefly in regard to the manner in which the elementary atoms of which they are composed may be supposed to be grouped together. To a few of these I shall here briefly advert, as they will enable the reader better than any thing else to form a proper estimate of the true state of our knowledge in this department of the science.

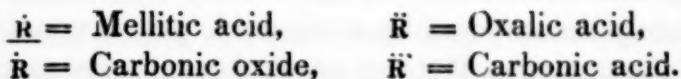
Are vegetable principles binary compounds?—1. It has long been the opinion of certain chemists, and has lately been ably maintained by Dumas, that vegetable or animal principles containing three or more elements, ought not to be regarded

as simple combinations into which the elements enter singly, or as combinations of the first order, but as made up of two binary compounds of the first order, which unite together in virtue of their opposite electrical states, as an acid and an alkali do. Thus sugar may be considered as a compound of carbonic acid and carburetted hydrogen, and the ethers as composed of etherine, which gives the general character to all, and of water or an acid which imparts its peculiar properties to each. This view of organic principles is very simple, and gives a very clear idea of the way in which the elementary atoms are grouped; but while we admit the probability of the hypothesis, so many facts militate against it, that it cannot be received as a law. One of the strongest of these is, that we know only of one or two cases in which these compounds can be resolved into their supposed binary elements; and none in which they can be artificially produced by uniting them. The interesting observation of Brande, that in the galvanic circuit the vegetable alkalies are not decomposed, appears also to oppose the idea of their being binary compounds. Many of the vegetable acids also appear so obviously to be oxides of a compound radical containing hydrogen and carbon, that we should be neglecting the most striking analogies were we to adopt the opinion of Dumas in regard to them; while on the other hand, the discovery of benzule by Liebig and Wæhler puts beyond question the existence of compound radicals of several elements, in which no such binary grouping can be supposed to have place.

Dr. Prout's view.—2d. A view of a different kind has been advanced by Dr. Prout, in regard to the arrangement of the elements in a large class of vegetable compounds. In sugar, gum, and starch of different kinds, he has shown that the oxygen and hydrogen exist in the same proportion as in water, and therefore suggests that such substances may in reality be compounds of water and carbon. Such views are valuable as well as interesting when they are drawn as deductions from a large number of analytical results, as those of Dr. Prout's are, but they are on the other hand productive

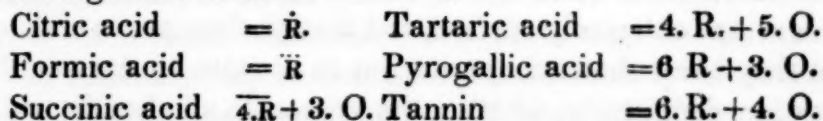
of much mischief when they are adopted on theoretical grounds, and the experiments afterwards instituted to confirm them.

Are the vegetable acids, oxides of compound radicals?—3. A third theoretical view, not destitute of probability, is that which represents the organic acids as oxides of a compound radical. Thus, if we put $2C + O = R$ a supposed radical, we have—

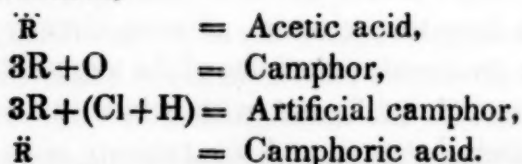


But there are difficulties attending this representation of the constitution of these compounds. Carbonic *oxide* contains more oxygen than mellitic *acid*, while oxalic, the stronger, contains less oxygen than carbonic, the weaker acid. It is not unlikely that future researches may supply us with a more satisfactory mode of obviating these difficulties, than we are yet acquainted with.

Again, if we take $C + \frac{1}{2}H = R$, we have the base of the following suite of acids:—



The crystalline compound discovered by Opperman as the base of artificial camphor $= 4C + 3H$. If we represent this by R we have,



It is very interesting by means of such formulæ to compare the atomic composition of bodies possessing properties so different. That the acetic and camphoric acids are oxides of the same compound radical, does not appear probable, but the facts to be stated respecting benzule render it highly probable that the three compounds here classed along with it, have the same radical as the camphoric acid.

Does the azote in vegetable alkalies constitute ammonia?—

4th. It has been found that the vegetable alkalies, so far as they

have been examined with care, contain as an essential constituent, a considerable quantity of nitrogen; and the question early suggested itself—does the nitrogen in these salt bases exist in the form of ammonia? If so, it would be easy to understand why they exhibit alkaline properties. The experiments of Pelletier and Dumas appeared to supply a negative answer to the question, as well as the later ones of Liebig, who found that though brucine and strychnine are completely decomposed by nitric acid, yet ammonia is not one of the products. But there are other circumstances which are considerably in favour of the opposite opinion. Thus, in the six vegetable alkalies, morphine, narcotine, strychnine, brucine, quinine, and cinchonine, Liebig found that each atom contained one atom of nitrogen, and that thus the saturating power of each was in proportion to the amount of that element which it contained. The sulphates he found also to contain two atoms of water,* corresponding exactly to the quantity of water found by Mitscherlich to exist in the crystallisable salts of ammonia with the oxacids. These coincidences are extremely curious, and though they prove nothing, yet they show that we are not yet in a state to answer the question, definitively, whether the vegetable alkalies do really contain ammonia or not.

Are vegetable principles educts or products.—5th. I shall only advert to one other point, on which considerable doubt will probably for a long time remain. I have already stated how numerous the proximate principles of the vegetable kingdom, acid, alkaline, and indifferent with which we are acquainted, have already become, and the rapidity with which their number is increasing. In regard to them also, an interesting question arises. Do they all exist ready formed in the vegetables from which they are extracted, or are they not often the *product* of the lengthened processes by which they are obtained? There is one test by which we can scarcely be deceived in determining this point. When the principle extracted possesses the virtues of the plant from which it is

* The sulphate of strychnine he has since found may be obtained in an anhydrous state.

prepared, the probability is very great that it exists ready elaborated in the natural state of vegetable. When it possesses no such properties, we can have no evidence, but the simplicity of the process by which it is prepared, that it is not the result of the treatment to which the vegetable has been subjected. And even this is not conclusive evidence; for though the process for extracting oils, by distilling the parts of plants with water is very simple, it has been shown that these oils do not always exist ready formed in the substance of the vegetable. Thus, from bitter almonds, alcohol or ether extract no oil, nor is any formed in them by the aid of heat, until water is added. The same is the case with the volatile oil of mustard seed. Now what happens in these cases is likely to take place in many others, so that it will probably be long before we are able to determine in all cases what are, and what are not real proximate principles. It will be still longer before we are able to refer each of them to its true place in a purely chemical arrangement, and to make them out to be so many determinate compounds of a series of organic radicals. The first step towards such an arrangement has been made by the discovery of the relation between benzoic acid and oil of bitter almonds; and we may hope that similar discoveries will gradually diminish the confusion and obscurity which at present prevail in animal as well as in vegetable chemistry.

Sulphur Salts. The most important modification which the received views in regard to the nature of saline combinations and the mode of naming them has of late years undergone, has been brought about by the elaborate researches of Berzelius into the constitution of the sulphur salts. The results of these researches were first published in six memoirs in the Swedish Transactions for 1825 and 1826, and afterwards in Poggendorf's *Annals* for the latter year. In the outset of his first memoir, he divides all electro-negative bodies into three classes.

1st. Such as combine directly with and neutralize the electro-positive metals, forming salts. These are chlorine, iodine, bromine and fluorine, and are named *salt-formers*.

2d. Such as do not neutralize, but form acids or bases when they combine with other bodies. These are oxygen, sulphur, selenium and tellurium, and are called, *acid-and-base formers*.

3d. Such as possess neither of these properties, but which with bodies of the second class form acids. These are azote, hydrogen, phosphorus, boron, carbon, silicon, arsenic and the electro-negative metals.

He then proceeds to describe the preparation and properties of a vast number of compounds of sulphur with the simple bodies, in which he demonstrates the striking analogy between that substance and oxygen; and shows—

1. That sulphur gives a numerous and interesting class of salts in which the oxygen in the oxygen salts is replaced by an equal number of atoms of sulphur, and that this exchange in many oxygen salts may be effected by a current of sulphuretted hydrogen, the hydrogen of which combines with the oxygen both of the acid and the base, and the sulphur takes its place.

2. That many of these salts, and generally all those of the metals which form with oxygen, alkalies, or alkaline earths, dissolve in water, crystallise, combine with water of crystallisation, unite with one another and with oxygen salts to form a double salts, exhibit different degrees of saturation, and in these follow the same multiples as the oxygen salts.

3. That the sulphur salts are formed in such proportions as generally to have corresponding oxygen salts, but that several classes of sulphur salts have been obtained, the oxygen salts corresponding to which are as yet unknown. Thus, for example, he formed three sulphur salts of arsenic, two of molybdenum, three of antimony, and one of tin, while of arsenic we know only two oxygen acids, and of molybdenum, one. Considerable obscurity still attaches to the compounds of oxygen and tin.

4. That the radicals of all the oxygen acids do not give sulphur acids, or at least that they have not yet been formed. Thus with chlorine, iodine, bromine, fluorine, azote, boron, silicon, titanium and selenium, he could form no sulphur acids or salts: the compound radicals of the organic acids

are in the same condition, though a mode of replacing their oxygen by sulphur may yet be discovered.

5. Negative or acid combinations of sulphur, (and consequent classes of sulphur salts) were formed with hydrogen, carbon, phosphorus, arsenic, molybdenum, tungsten, tellurium, antimony, tin, and less distinct ones with chromium, tantalum, gold, platinum, rhodium, and probably some other metals.

Chlorine Salts.—While Berzelius was pursuing his investigations into the nature of the sulphur salts, Bonsdorf, according to his first paper on the subject in the *Annales de Chimie*, had been led into similar views in regard to the chlorides and iodides. Led by the analogy which exists between oxygen, chlorine and iodine, in producing combustion when uniting with simple substances, and in forming soluble compounds with many fixed bodies, he adopted the opinion that chlorine, iodine, bromine and fluorine, like oxygen, were *acid-and-base formers*, producing by their union with the metals and other simple bodies, compounds which possess the properties of acids or bases. In support of this view, he showed that many simple chlorides and iodides might be made to combine into what were formerly called double chlorides, in which he supposed the one chloride to act the part of an acid, the other the part of a base, and he invented a nomenclature in accordance with his peculiar opinions. If the views of Bonsdorf are correct, the distinction which Berzelius makes between his *salt formers* and his *acid-and-base formers* is not founded in nature. Dr. Thomson has adopted these views and incorporated them in his system of *Inorganic Chemistry*, and Professor Daniell assumes that we cannot adopt the views of Berzelius in regard to sulphur salts, without making those of Bonsdorf our own also; but it appears to me that the two opinions stand upon very different grounds, and that however simple the views of Bonsdorf may render the consideration of the chlorine &c. salts, they can never be ranked in the same family with those of oxygen and sulphur.

The main chemical distinction between oxygen and chlorine is this—that while chlorine neutralises an electro-positive

metal and forms a salt with it, oxygen never neutralises the metals, but forms with them compounds possessing either acid or alkaline properties. The opinion of Bonsdorf is, that the chlorides are not neutral compounds, but that, like the compounds of oxygen with electro-positive elements, they are all either acids or alkalies, and that when they unite they do so precisely as an oxygen acid and an oxide do, forming a simple chlorine salt, in which the chlorine acts the part of the oxygen, as the sulphur does in the sulphur salts.

The evidence brought forward by Bonsdorf in support of this opinion, is as follows:—

1. The bichloride of mercury and other electro-negative metallic chlorides redden litmus, and they lose this property when they unite with a certain quantity of a more electro-positive chloride to form a double salt. Such chlorides &c. must therefore be held to possess acid properties.

2. Sugar has a strong affinity for bases; it forms also a crystalline compound with common salt, and therefore it is probable that the chloride of sodium is a base. He has endeavoured to confirm this conclusion by showing that though the chlorides of lime, sodium &c. exhibit no immediate action on reddened litmus or cudbear paper, yet that a slight change of colour may be observed in the course of half a day or a day upon cudbear paper that has been dipped into solutions of the chlorides of calcium, magnesium, manganese and zinc. That the slowness of this action is no proof of the absence of alkalinity, he endeavours to support by the example of the caustic alkalies, which do not act upon reddened litmus paper until they are moistened. It is not the alkali alone then, he infers, which alters the colour of the paper, but the alkali and water together.

These views are neutralised by the two facts advanced by Berzelius:—1st. That the protochlorides of the older metals, including iron and manganese, give in solution a red colour to litmus paper, and therefore should, on Bonsdorf's views, be called acids. 2d. That the protosulphate of iron also reddens litmus, and forms with sulphate of potash a crystallisable double salt which is perfectly neutral. The first of these sulphates

therefore should be an acid, and the second a base, and the compound a simple salt, were we to proceed upon such evidence as has been brought forward by Bonsdorf, in favour of his chlorine salts.

The object of Bonsdorf's papers is not merely to afford a simple theoretical explanation of the composition of the salts of chlorine, iodine &c. but to destroy the distinction hitherto made between this class of simple substances and that which comprehends oxygen, sulphur, selenium and tellurium; to place, in short, the chlorides, iodides &c. on the same footing with oxides and acids. To establish the complete analogy between the sulphur and oxygen salts, we have seen that Berzelius showed the existence of sulphur acids, agreeing precisely in composition with the oxygen acids, the latter elements being merely replaced by the former; that suites of acids were formed by sulphur with the same metal, as is the case with oxygen, and that in some cases the analogy was so close that metals which like tellurium form weak acids with oxygen, gave corresponding weak acids with sulphur. But in the chlorides we have no such analogies. There are no acid chlorides corresponding to the oxygen acids, no suites of acids with the same base corresponding for instance with the oxygen acids of arsenic or antimony. The chlorides which Bonsdorf calls acids have mercury, gold, platinum and palladium for their bases, with none of which does oxygen form an acid.

Bonsdorf is not unsupported in his views by the opinions of other chemists. In the same volume of the *Annales de Chimie* in which appeared his first paper on the double chlorides, is contained a valuable memoir by Boullay on the double iodides, and on some compounds of the iodides with the chlorides. These compounds he represented as simple salts, in which the one iodide acted as an acid, the other as a base, agreeably to the views of Bonsdorf in regard to the chlorides. Dr. Thomson has also adopted the nomenclature of Bonsdorf.

On the other hand his views are opposed by Berzelius and most of the German chemists. Leibig also, who about the same time with Boullay investigated many of these double

salts, and among others those which the cyanide of potassium forms with the chloride and the iodide of silver, the iodide of potassium with the cyanide of mercury, and the nitrate with the iodide of the same metal, met with difficulties which induced him to reject it. The objections that have been advanced against his theory, Bonsdorf has endeavoured to remove in a valuable paper on some new double bromides, published in the *Stockholm Transactions* for 1830.

Chemical Notation.—Some discussion has latterly taken place in the English journals on the subject of chemical and mineralogical notation. Berzelius, and after him the German chemists, have long been in the habit of using symbols to denote chemical substances and their compounds. In contriving these symbols, the initial letter of the Latin name of each substance was selected as the sign of that substance. Thus, Fe, *ferrum*, denotes iron; Sn, *stannum*, tin; Tu, *tungsten*; O, *oxygen*; S, *sulphur* &c. Adding these Fe+O, or $\text{F}\ddot{\text{O}}$, is protoxide of iron; S+3 O, or $\text{S}\ddot{\text{O}}$, sulphuric acid; Fe+2 S, or $\text{F}\ddot{\text{S}}$, bisulphuret of iron. When two or more binary compounds are united, as $\text{S} + \text{Fe}$, forming sulphate of protoxide of iron, for the sake of shortness SFe are placed together, without any sign between them; and in organic compounds, where three or more elements are present, as in cyanic acid, instead of placing the elements N+2C+O, they have been grouped thus, NC^2O , where the number of atoms of carbon is denoted by the index placed over its symbol.

This notation possesses the two great requisites *clearness* and *brevity*, and it would be very difficult to devise any other system which should possess them in an equal degree. It has been objected, however, that it has appropriated a mode of notation already employed in algebra with a very different signification, and it would certainly have been desirable if such an appropriation could have been avoided.

In the simple cases given above as illustrations, it is not very much longer to write N+2C.+O for cyanic acid, which is algebraically correct, than to express it by NC^2O ; but if we go to more complex cases, we shall find pure algebraic notation become so cumbersome as to impair very mate-

rially both the requisites of a chemical notation; thus cyanate of ammonia, $\text{NC}^{\circ}\text{O} + \text{NH}^{\circ} + \text{H}$, represented algebraically is $(\text{N} + 2\text{C} + \text{O}) + (\text{N} + 3\text{H}) + (\text{O} + \text{H})$, a form of notation which is much longer, but if we take an extreme case, like the double ferrocyanides formed by Mosander, we shall see how the clearness as well as the brevity of the notation will be impaired. One of these salts is composed of an atom of ferrocyanide of potassium united to an atom of ferrocyanide of magnesium, thus expressed, $(\text{FeNC}^{\circ} + 2\text{KNC}^{\circ}) + (\text{FeNC}^{\circ} + 2\text{MgNC}^{\circ})$, which with all the algebraic signs interposed becomes, $((\text{Fe} + \overline{\text{N}} + 2\overline{\text{C}}) + (\text{K} + \overline{\text{N}} + 2\overline{\text{C}})) + ((\text{Fe} + \overline{\text{N}} + 2\overline{\text{C}}) + 2(\text{Mg} + \overline{\text{N}} + 2\overline{\text{C}}))$, while it is very desirable therefore to express the composition of chemical compounds by a notation as nearly algebraical as possible, it would obviously be a sacrifice to sacrifice both brevity and clearness to insert all the algebraical signs in *all* chemical formulæ.

Arbitrary Symbols.—For the purpose of simplifying notation, several arbitrary signs have been introduced by Berzelius. Thus the dot (.) over a letter denotes an atom of oxygen; the comma (,) an atom of sulphur; a horizontal line, (—) selenium; a cross, (+) tellurium. A long line (—) over a letter, denotes that it is an organic acid.

Oxymolybdate of potash = $\text{K} \ddot{\text{M}}_{\text{o}}$ or $\text{K} + \ddot{\text{M}}_{\text{o}}$

Sulphomolybdate of potash = $\text{K} \ddot{\text{M}}_{\text{o}}$ or $\text{K} + \ddot{\text{M}}_{\text{o}}$

Selenomolybdate of potash = $\text{K} \overline{\text{M}}_{\text{o}}$ or $\text{K} + \overline{\text{M}}_{\text{o}}$

Telluromolybdate of potash = $\text{K} ^+\text{M}_{\text{o}}$ or $\text{K} + \text{M}_{\text{o}}$

$\overline{\text{T}}$, tartaric acid, $\overline{\text{A}}$, acetic acid &c.

Abbreviations also are employed; thus Cy is cyanogen = $\text{N} + 2\text{C}$; Bz is benzule = $(14\text{C} + 10\text{H} + 20)$.—*British Association for promotion of Science*, second meeting.

ART. IX.—ON DIFFERENT KINDS OF GUMS.

By M. GUIBOURT.

Pseudo gum tragacanth, or gum sassa.—About a year since I for the first time met with, at a merchant's, a very peculiar gum, in mammillary masses of a tolerably large size, or in convoluted pieces resembling an ammonite; there were also some parcels that looked like large snails deprived of their shells. This gum is of a reddish colour, its surface is somewhat shining, and it is more transparent than gum tragacanth; it possesses the taste of this latter, with however a little acidity; when placed in water it becomes quite white, swells to four or five times its original size, but does not fall into flocculæ like gum Bassora, nor form a mucilage like gum tragacanth; it nearly preserves its form, and is very little soluble. A solution of hydriodate of iodide of potassium imparts a very intense blue colour to it.

Bruce, in his travels in Abyssinia, has described a tree named *sassa*, (*INGA sassa*, Willd.) which he says he has seen loaded with so great a quantity of lumps of gum, as to appear deformed. This gum is reddish, of a smooth and fine grain; it swells in water and becomes white, but preserves its form, thus differing from gum tragacanth, which it otherwise closely resembles. The inhabitants use it to stiffen cotton and other goods.

This description applies so exactly to the gum under consideration, that we cannot avoid supposing it to be the gum *sassa* of Bruce. From what was told me, it appears that it was bought in London about twelve years since, at the East India Company's warehouse. The barrel which I saw, the remains of a much larger quantity, weighed about 250 pounds.

In since searching for this gum, I found a whole case labelled *gum tragacanth*, and sold as such, which attracted my attention from the cornu ammonis-like form of several of the pieces. This gum, when culled, appeared to be composed of two different substances, one formed of the largest fragments and comprising all the convoluted pieces, was the most red,

scarcely dissolved in water, and struck almost as deep a blue with iodine as starch; this was evidently gum sassa. The other portion, composed of the smaller fragments, was whiter, and was perfectly analogous to gum tragacanth in its form and taste. Nevertheless, it was not in as small pieces as the true gum tragacanth; from this and from other characters, I have denominated it *pseudo gum tragacanth*.

If twelve grains of the pseudo and true gum tragacanth be steeped in water, both swell and form a mucilage, the latter, however, more readily than the former; so far, these two gums appear to differ but little, and can scarcely be separated. But if, when they are thus dissolved, two ounces of water and a certain quantity of ioduretted hydriodate of potassa be added, the gum tragacanth continues to form a thick and tenacious mucilage, of an uniform pale blue colour, which does separate by standing; whilst the other gum precipitates and forms a dark blue deposit, leaving the fluid colourless. But, as this result was obtained from the finest pieces, and those which most closely resembled gum tragacanth, and as the larger and darker fragments possessed the insolubility of the gum sassa to a greater degree, it appeared reasonable to conclude, that the pseudo gum tragacanth and that of sassa originally constituted but one species, which had been culled to obtain a better sale for that portion of it which most closely resembled gum tragacanth, but which may always be distinguished by a greater insolubility in water, and by the deeper colour it assumes on the addition of iodine.

I sought for other differential characters by means of the microscope, with the following results:—

Gum tragacanth.—Fine gum tragacanth dissolved in water, with the addition of a little ioduretted hydriodate of potassa appeared to be formed of the following parts:—

1. A gelatinous mucilage, not coloured by iodine, without defined edges, irregularly studded with spherical granules, generally very small, but sometimes of a larger size; these granules are a kind of starch. This gelatinous mucilage is only visible when the field of the microscope is illuminated by the direct rays of the sun; in other lights, it is only

manifested by vibrations communicated to it. In such case, all the granules experience a similar oscillating motion, maintaining at the same time their respective positions, thus furnishing an indication of the invisible bond that unites them.

2. A great number of granules of starch in the middle of the liquid, arising from the complete division of the gelatinous matter.

3. Of a number of transparent gelatinous membranes, tinged of a light yellow colour by the iodine, having a defined edge of an irregular ovoid form, unguiculate on one side, closely resembling a petal of a flower. These membranes which perhaps are hollow, are studded with granules of starch, in irregular groups. These membranes and their groups of granules, are without doubt the advanced stage of an organization, analogous to that of the *Bichatia vesiculosa*, (Turpin,) and which had reached its maturity and been destroyed in the two preceding forms.

4. Portions of compact, thick membranes, coloured yellow by the iodine, in distinct groups mixed with granules of starch collected in compact masses, like bunches of grapes.

5. Woody fibres.

The woody fibres and the compact membranes appeared to be adventitious. The starch, which constitutes an essential part, ought to be separated from gum, strictly speaking, if the latter be considered in a chemical point of view; for it is evident, that the starch is acted on by the water, and hence the peculiar characters of the gum are not owing to it. The truly essential part of the gum tragacanth, and which alone merits the name of *Tragacanthine*, is the gelatinous portion of No. 1; and that of No. 2, which being in a more divided state, is capable of passing through a filter, and gives to the filtered solution, the properties I have ascribed to it in *L'Histoire des Drogues*, tom. 2, p. 268.

The starch of gum tragacanth differs from that of the cerealia and of farinaceous roots; for in the latter it is composed of an insoluble integument and an internal soluble substance, both capable of being coloured by iodine, and only differing in the state of organization and cohesion of the in-

tegument, whilst the starch of gum appears to be entirely formed of a dense organised matter, affording but little soluble matter to boiling water; hence the residue of a treatment of gum tragacanth by boiling water, is formed of a large quantity of insoluble starch and ligneous fibres.

For some years past, there has been in commerce, a kind of gum tragacanth in large white plates, which differs from the true gum by containing a large proportion of soluble tragacanthine; hence its mucilage possesses an almost complete transparency, and is consistent and gelatinous; it may also be remarked that it is scarcely coloured by iodine. I am ignorant whether this gum is a natural product, or the result of a purification of gum tragacanth. Let this be as it may, this gum examined with the microscope, when suspended in water and coloured with iodine, presents only a few isolated grains of starch, No. 1, and some gelatinous mucilage, No. 1. The greater part of it was composed of the membranes, No. 3, but very thin and scarcely visible. This gum appears to be preferred in sizing calicoes &c., but it furnishes a less tenacious and a thinner mucilage than the contorted kind, and is not so good for the preparation of loochs and pastilles.

Pseudo gum tragacanth. The pseudo gum tragacanth, or small gum sassa, when steeped in water, swells and agglomerates like gum tragacanth, but if more water be added, the parts disunite and fall in flakes to the bottom of the vessel.

This gum coloured with iodine presented the following appearances under the microscope.

1. The same gelatinous mucilage No. 1, mingled with grains of starch, which formed the larger portion of the true gum tragacanth: except, that in the present instance, it is denser, and hence less soluble in water; the grains of starch are also more numerous.

2. Other gelatinous products, which not being transparent, are very visible, having sometimes the density of a membrane and in that case coloured yellow by the iodine.

3. Some yellow membranes like those of gum tragacanth, others larger and more diaphanous, as if about to disappear.

4. Masses of fecula, and granules isolated in the liquid.
5. Bundles of torn transparent tissue; woody fibres and a transparent yellow disk, traversed by parallel lines of spiral tubes.

Gum sassa. This gum under the microscope presents the following appearances.

1. Very visible gelatinous masses, not transparent; and studded with innumerable granules of fecula; the thickest portions appeared of a yellow colour.
2. A great number of fragments of compact, transparent membranes, coloured of a deep yellow by the iodine.
3. Yellow membranes destitute of granules of fecula, and others in folds which contained masses of fecula coloured blue.
4. Isolated blue grains, some of them large, resembling those of gum Bassora.

If, as has been seen, a microscopic examination furnishes some characters to distinguish gum sassa from gum tragacanth, it also shows us, that these two gums result from a similar order of organization, which I believe to consist in a membranous sac containing the gelatiniform matter and separate groups of grains of fecula; so that on the rupture of the sac, the gelatinous matter becomes susceptible of division and of partly dissolving in the water, so that the fecula becomes disseminated. Moreover, gum sassa differs from gum tragacanth, exactly as the starch and different parts of barley, differ from the corresponding parts of wheat; by a firmer and more compact organization, which renders it less soluble in water. Like these feculæ also, gum sassa and gum tragacanth are produced by plants belonging to two different genera of the same family. The first is furnished by the *Acacia sassa*, Bruce, (*Inga sasa*, Willdenow,) the latter by different species of *Astragalus*.

This conclusion leads me back to Bruce and his description. I am of opinion that this celebrated traveller is mistaken, when he states that gum sassa was the *opocalpasum* of the ancients, merely because gum sassa comes from the same country as myrrh, and that the *opocalpasum* was formerly

used to falsify myrrh; but independently of gum sassa having no resemblance in form or smell to myrrh, Dioscorides and Galen speak of the opocalsamum as the juice of a narcotic and poisonous plant. Valmont de Bomarre was therefore right in concluding that the opocalsamum was not gum sassa.

Valmont de Bomarre, on the other hand, was not aware that a gum of which he was the first to speak under the name of gum bassora, was the same as gum sassa, for the use which he indicates for gum bassora, as serving to stiffen cotton goods &c. is only applicable to gum sassa, and not to the substance which now bears the name of gum bassora, whose complete insolubility and want of cohesion render it wholly improper for this purpose. If it be considered that the gum bassora of Valmont de Bomarre appears to be the first that bore this name, we might be tempted to restore this application to it; but as the other gum, is the only one containing *bassorine*, a principle, whose name is universally adopted in chemistry, it appears to me that we must give the old name of gum sassa to that described by Valmont de Bomarre, and retain the appellation of gum Bassora, for that which contains bassorine.

Gum Bassora.—I give this name to the gum which was examined under the same name by M. Vauquelin, and which I described in *L'histoire des drogues simples*, No. 788, and finally which was examined by M. Theodore Martius, under the name of *gum kutera*. This gum is white, or of a honey colour, and farinaceous or silvery on its surface, in pieces which are flat and long rather than rounded, although it is sometimes rounded and mamillary. These pieces are of all sizes. It is less transparent than gum Arabic, less opaque than gum tragacanth; it is insipid, and crackles under the teeth. It is not soluble in the saliva like gum Arabic, nor does it form a mucilage like gum tragacanth.

When placed in water, it swells considerably, and is converted into a transparent jelly, which has no cohesion, so that it does not, strictly speaking, form a mucilage. When a greater quantity of water is added, all these gelatinous par-

ticles separate and fall to the bottom. This want of cohesion, and this complete insolubility of the gelatinous particles, form the peculiar character of gum Bassora, and render it unfit for the arts. This jelly does not become blue on the addition of iodine, at least it is not perceptible to the naked eye; this serves to distinguish it from gum tragacanth and gum sassa. Finally, another property of this insoluble jelly is that it may be preserved longer without alteration than any other substance of the same kind. Gum Bassora is not wholly composed of this insoluble substance, as we found 0.08 of a grain in the washings, very like gum Arabic.

The microscope also shows that it is organized in a wholly different manner from the two preceding gums; when mixed with water, with the addition of iodine, there may be seen:

1. Gelatinous, dense masses, of a mamillary appearance, very slightly but uniformly of a bluish colour. This mamillary gelatinous substance forms the greater portion of the gum, and probably gives it its distinctive characters; it is to this I give the name of *bassorine*. It here and there presents some large, spherical isolated grains of fecula.

2. Other gelatinous parts presenting a ramified fibrous structure; the isolated fibres appear to be formed by the union of transparent spherical granules. These are tinged of a yellow colour by the iodine. Grains of fecula appear to be attached to some of these fibres.

3. The liquid, in the midst of which the above substances are found, presents a great number of very small, spherical grains, of the same size, apparently very dense, and of a yellow colour. These grains appear similar to those which form the fibrous structure. No. 2. This same fluid also contains large isolated granules of fecula. Finally, there are some compact masses of small yellow grains, fragments of dense membranes, and ligneous fibres.

It is difficult to say what relation exists between the small yellow spherical grains, or the fibrous structure formed of them, the grains of fecula, and the mamillary gelatinous matter, which exist separately and in about the same proportions. The yellow grains are probably organised; the bluish gela-

tinous matter may only be the product of an excretion, and the grains of fecula may be derived from the parts of the vegetable traversed by the gummy juice, before excreting.

I must now say a few words on the origin of gum Bassora. M. Virey attributes it to a *mesembryanthemum*; but the large size of some of the pieces, and the fragments of the bark of a tree which are found among it, render this supposition wholly inadmissible. According to Dr. Martius, this gum comes from India, and may be produced by the *Acacia leucophlæa*, Roxburgh; I, on the other hand, have often found it among gum Senegal, but, as has already been mentioned, I cannot say whether it came there naturally or accidentally.

Last year, a package was found in an old established drug store in Paris, lined on the inside with a cotton cloth, like those coming from India; this was labelled *bdellium from India*, and was filled with a peculiar gum, about to be described, mixed with a quantity of gum Bassora; it is therefore probable, that the origin assigned to it by Dr. Martius, is correct.

Gum Lignirole.—By the advice of my colleague, M. Chereau, I give this name to a peculiar product found among gums from Senegal and India, and which is formed of a soluble gum like gum Arabic, and of worm eaten wood.

Gum lignirole of Senegal.—This has already been mentioned in my "Histoire des drogues" under the name of *marons de gomme*, (No. 794.) It is sometimes yellowish, but generally of a dark brown or blackish colour; it is dull, and the wood it contains is visible to the naked eye. I endeavoured for a long time to discover what was the cause of this mixture of worm eaten wood and gum; but having observed that most of the pieces presented a large ovoid cell, which might have served as the habitation of the chylalis of an insect; I have supposed that this sort of mastic might have been made by the insect itself, as occurs in several species of the order of Hymenoptera.

Gum lignirole of India.—This is the substance in which the gum bassora was found, and which was labelled *bdellum from India*. It had the appearance of resin, but was reddish, and

when treated with water, all the gum was dissolved, leaving a residue of worm eaten, very light, yellowish white wood. It was very hard and difficult to break, was tenacious under the teeth, had generally a disagreeable and somewhat acrid taste; and presented some ovoid cells like the preceding, and others which were smaller and more tortuous; it contained more fragments of wood internally than externally; it also appeared, though not so manifestly, to be attributable to insects.

In the *Annales de Chimie et de Physique* for March 1832, will be found a memoir on the gums, in which the author thinks that he has established that with the exception of some hundredths of calcareous and other salts, that all gums are composed of three immediate principles, viz: *Arabine*, *cerasine* and *bassorine*. I would state on this point, that long before this chemist, but subsequent to M. Desvaux, I had strongly insisted on the necessity of not confounding the *products* of plants with their *immediate principles*, and more especially in the gums. After having described in *L'Histoire des drogues*, those of commerce, I divided them into five *chemical species*, viz:—

1. Soluble gum of gum arabic and Senegal, and soluble gum. (*Arabine*.)
2. Soluble gum of cherry, plum, &c.
3. Soluble gum tragacanth.
4. Insoluble gum of Senegal and cherry. (*Cerasine*.)
5. Insoluble gum bassora and soluble gum. (*Bassorine*.)

Perhaps I was wrong in separating the soluble gum of cherry from that of Senegal, especially, as the insoluble gums of these two kinds appeared identical; but, at all events, it would be very difficult for apothecaries, who daily dissolve one part of gum arabic in even less than two parts of cold water, to believe with the author of the memoir, that 100 parts of water do not dissolve, at the temperature of 77° more than 18.49 of soluble gum, and only 24.14 at 212° F., and moreover, it is at best an erroneous mode of fixing the solubility of gums, on the greater or less facility with which the solution passes through filtering paper.

From my recent experiments which confirm those I for-

merly made, I am convinced that gum tragacanth is formed of an organised, gelatinous substance, which swells in water and becomes infinitely divided in it, but the solution will not pass through a filter, and differs in all its characters from the soluble gum of gum arabic.—*Jour. de Chim. Med.*

ART. X.—ON OPTICAL CHARACTERS AS A DISTINGUISHING MARK OF THE DIFFERENT KINDS OF SUGAR.—By M. Biot.

(Extract.)

M. Biot, some time since, in his memoir on circular polarization, announced the curious fact that grape sugar, whether obtained from grapes or the numerous other vegetables which afford it, had the property of diverting the polarization of luminous rays towards the left, before it assumed the solid state, and of diverting them in an opposite direction as soon as solidification had once taken place, even when again dissolved in water or alcohol.

In investigating this property in other vegetable juices, M. Biot was led to conclude that such a sudden change in molecular arrangement did not take place in cane sugar, which always diverts the polarization towards the right, whether it be derived from the cane or from beets, carrots or other vegetables furnishing this sugar, and whether the experiment be tried before or after its solidification. These experiments, which serve as a guide in determining what kind of sugar may exist in the juices of different vegetables, also presented other interesting phenomena.

The juice of the parsnip, white carrot or turnip, obtained by pressure from the rasped root, after being boiled, produced double the rotation towards the right than before this process. This increase in the diversion of the rays of light, is produced by the development of the substance which M. Chevreul has termed *Amidine*, and which Messrs. Biot and Persoz have named *Dextrine*, from the property it so eminently possesses of directing the polarization of the rays of light to the right;

this substance constitutes the interior of the grains of fecula, from which it is disengaged by ebullition. It may be precipitated by means of alcohol from the liquids in which it is dissolved; and when mixed with diluted sulphuric acid and boiled, it is converted into sugar.

Beet juice, as has already been shown by M. Pelouze, and which is confirmed by the optical experiments, contains crystallizable sugar only; (10 to 14 per cent.) by treating it with alcohol, a white substance like dextrine is separated which is soluble in water, but is not gum, as it does not produce polarization to the left, nor is it dextrine, as it causes no deviation of the rays to the right. It would be interesting to examine this product, the formation or presence of which must necessarily have an influence on the manufacture of beet sugar.

The development of dextrine by ebullition in roots merits consideration, when a comparison of their alimentary properties is made; for if, according to the observations of Leuwenhoeck, this substance alone is nutritive, it is certainly better to employ boiled rather than raw roots in feeding cattle, ebullition tearing or softening the envelopes of the utriculi which contain the nutritive substance, or dextrine.

The phenomenon of circular polarization having furnished a marked character by which it expresses the actual molecular arrangement of the bodies in which it occurs, Messrs. Biot and Persoz have pursued their investigations still further, and ascertained its applications in chemical reactions, where the subject of the experiment experiences successive modifications.

From numerous well conducted experiments, they ascertained that a limit of temperature exists between 194° and 201° F., where the rotatory force is at its maximum. Beyond this, or between 201° and 212° F., this force undergoes a sudden and great reduction; ebullition continued for a certain time, reduces it still more; after which, no prolongation of this process has any effect, provided the portions of fluid which are evaporated be replaced by the addition of water.

Acad. des Sciences.

ART. XI.—ON THE IODO-HYDRARGYRATE OF POTASSIUM.

By WILLIAM CHANNING, M. D., of New York.

A CASE of severe affection of the lungs, of several months standing, which came under my care in February, 1832, assumed a few weeks afterwards, a character so serious as to destroy all hopes of recovery, unless by some new expedient the progress of disease should be speedily arrested.

Having already put into requisition unavailingly, the various resources of art sanctioned by respectable authorities, in the desperate circumstances to which my patient seemed reduced, I resolved to make trial of one of the iodides of mercury; medicines which, combining in a remarkable manner the active properties of their energetic elements, had frequently been a favourite subject of reflection, and (for reasons unnecessary here to particularize,) had to my mind promised much for cases of chronic pulmonary disease.

"Both these compounds," says professor TURNER, "are insoluble in pure water, but are dissolved by a solution of the hydriodate of potassa." They are both, and especially the deutiodide, soluble also in alcohol. But, as I had repeatedly experienced since the suggestions of LUGOL, the decided advantages of the hydriodate of potassa over alcohol as a solvent for the exhibition of iodine, it was adopted, with similar views in this instance, for the deutiodide of mercury, the more soluble of these mercurial compounds.

In thus preparing this medicine for exhibition, the physical changes which occurred were too remarkable to escape observation. I could not but be struck at once with the rapid disappearance of the brilliant red of the iodide of mercury, and the conversion to a straw colour of the clear colourless solution of the hydriodate of potassa, as the former was gradually added to the latter. Subsequently the mild taste of this solution of the deutiodide of mercury compared with its solution in alcohol, was a circumstance scarcely less likely to attract attention. At length, when on trial of their respective effects on the human system, a correspondent difference in the mildness of their action was manifest, the in-

ference was hardly to be resisted, that in this preparation the hydriodate of potassa acted a more important part than that of a mere solvent; or that in fulfilling this office, new affinities were developed, and new combinations formed worthy of investigation.

To determine this point more satisfactorily, a solution of the two iodides of mercury and potassium, at my request, was slowly evaporated by Mr. G. CHILTON, operative chemist of this city, when beautiful prismatic needle-form crystals appeared of a bright straw colour, so deliquescent as to be maintained only in a very dry atmosphere, and perfectly soluble in water and alcohol in less than one-third their weight; thus demonstrating the validity of the inference above stated, and establishing the existence in this combination of a definite compound, a new salt, not yet adverted to by any chemical work published in this country.

On referring to foreign publications, it appeared from the "*Annales de Chimie*," that this with other new salts had been discovered by Mr. P. A. de BONSDORF of the University of Finland, in 1826, and subsequently noticed in an interesting essay of his, originally published in the "*Annalen der Physik*;" maintaining the position that chlorine, iodine &c., like oxygen, enter into combinations, forming both acids and bases; that thus, the chloride of mercury unites with the chloride of sodium in definite proportions, the former as an acid, and the latter as an alkaline base; constituting, (according to the nomenclature harmonizing with this theory,) chloro-hydrargyrate of sodium.

In conformity with these views, (now adopted by some of the most eminent chemists of Europe,) the salt under consideration is noticed by its discoverer under the appellation of "iodo-hydrargyrate of potassium," and without touching upon its analysis, his remarks are limited to a simple statement of the mode of its preparation, and its appearance when prepared, as one of the many illustrations furnished by his experiments in support of the chemical doctrine he would uphold. But as this preparation soon after my acquaintance with it, developed medicinal powers of no ordinary impor-

tance, a more particular examination of its constitution became a matter of interest. The following is the result of such an examination, sufficiently accurate for practical purposes.

By experiment I first ascertained that a solution of eight grains of the *pure* iodide of potassium in a small portion of water, (10 or 15 minims,) would combine with a fraction less than eleven grains of the deutiodide of mercury, maintaining the combination in solution, diluted with water or alcohol to any extent. If more than eleven grains of the deutiodide were added, although a small excess was dissolved in the concentrated solution, on diluting with water, it was promptly precipitated.

Now as 10.9 : 8 :: 450 : 330, or

1 atom deutiodide of mercury 450 } are as { 10.9 to
2 atoms iodide of potassium 330 } 8.

Add to these per estimate—

4 atoms combining water 36 0.9

816 grs. 19.8

Giving as the constitution of the iodo-hydrargyrate of potassium, { 4 atoms iodine 500
1 atom mercury 200
2 atoms potassium 80
4 atoms water 36

Atomic weight 816

From this statement it is evident, that in preparing this salt for exhibition, the labour of crystallizing it in order to obtain a solution of a definite strength is wholly unnecessary; inasmuch as a solution, combining a fraction more than eight grains of the iodide of potassium with eleven grains of the iodide of mercury, may be used as containing twenty grains of the iodo-hydrargyrate of potassium, the difference, if any, being too small to merit consideration.

But if it be desirable to obtain the preparation in a crystallized form, it is important that the definite proportions of the two iodides be observed, particularly that there be no excess of the iodide of mercury. For the *saturated solution* of eight grains of the iodide of potassium will dissolve and enter into combination with more than *thirteen grains* of the iodide of mercury, forming similar crystals soluble in alcohol, but

in water precipitating more than two grains of the iodide of mercury. Hence, by dissolving a suspected preparation in twenty or thirty times its weight of pure water, any excess of the iodide of mercury is immediately detected.

The *substances incompatible* with this compound, are the mineral acids, the fixed and volatile alkalies, with their carbonates, acetate of lead, nitrate of silver, sulphuret of potassa, and all preparations containing free chlorine. There appears to be no reâction exerted upon it by the tincture of galls. Its administration in metallic vessels should be avoided.

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ART. XII.—REMARKS ON THE CULTURE OF SEEDS FOR, AND
THE MANUFACTURE OF VEGETABLE OILS.

By C. V. HAGNER, Manayunk, Philadelphia County.

I WAS much pleased to find in the Journal of the Franklin Institute for November, an essay containing some useful hints on the subject of the manufacture of vegetable oils. I have long been astonished that a subject of so much importance to the agricultural, manufacturing, and commercial interests of our country, should be so long neglected, and that more attention has not been paid to it. I am perfectly convinced that there are many seeds from which oil for various purposes could be produced, and which could be grown with great advantage to the agriculturist. All that is necessary, is to draw his attention to the subject, and induce him to make the experiment. It is but a few years since the *Palma christi*, (Castor Bean,) was first grown in quantities in this country, yet the introduction of it here has had the effect, as almost every one knows, of improving infinitely the quality of the oil, and of supplying the market at from two to three hundred per cent cheaper than was paid for the nauseous and miserable stuff, formerly received from the West Indies and elsewhere.

One of the seeds mentioned by your correspondent, colchi-

cum* or rape seed, is of the greatest importance, and produces an oil which is, and has long been, much wanted for manufacturing purposes. This seed is grown abundantly in all parts of Europe, and the oil made from it is extensively used in the process of manufacturing cloth; it is, I believe, the cheapest oil they have, and takes the place of the common kinds of olive oil, which the manufacturers of this country are obliged to use at a great cost: this is a matter of considerable importance, when it is known that to every 100 pounds of wool carded, there is consumed from two to three gallons of oil. The rape seed oil is so cheap and abundant in Germany that it is much used in adulterating linseed oil; hence the bad quality of some of the German paint oils, as the rape seed oil does not possess the drying qualities of that from flax seed, and is therefore unfit for the purposes of painting, &c.

Having been for a long time engaged in the manufacture of flaxseed oil, and having made various experiments on other seeds, I have, of course, had some experience on the subject. In relation to rape seed I had an excellent opportunity of making full and satisfactory experiments. In the year 1822 or 1823, an English gentleman who was familiar with the culture of rape seed, and who had a farm somewhere in the neighbourhood of Salem, N. J., brought to my establishment about forty bushels of rape seed, which he had produced upon his farm. The account he gave me of its culture was this. Two acres were sown with this seed, (broad cast,) in the month of August; it sprouted, and was growing very handsomely, but late in the fall the cattle broke into it, and as he thought completely destroyed it; he abandoned the experiment, and suffered his cattle to roam in it all winter; but in the spring, observing it sprouting again, he put up the fence, and as he expressed himself, "let it take its chance." The two acres with this, as he considered it, unfair experiment,

* Should not this be colza, the common name for the *Brassica campestris*, from the seeds of which the colza oil is extracted! this is generally confounded with the true Rape oil which is procured from the seeds of the *B. napus*. The colchicum affords little or no oil.—En.

produced him about forty-four bushels of seed, for which I offered him four dollars per bushel, which he refused to take. I expressed it for him, and although my apparatus was not by any means perfectly adapted to the purpose, the manufacture differing in some respects not necessary to state, from that of flax seed oil, I produced three and a half gallons per bushel.

The cake, that is, the pulp after the oil is expressed from it, he valued highly for fattening cattle, and refused to take seventy-five cents per bushel for it; the oil he sold to a wool-len manufacturer for one dollar and thirty cents per gallon; thus, including cake, realizing five dollars and thirty cents per bushel, out of which was paid the expense of manufacturing. It is, I am told, considered in England a profitable crop, although the price is not much, if at all, above two dollars per bushel. The gentleman was in high spirits as to the result, and told me he intended to go into the culture of it more extensively, but from what cause I do not know, I have never seen him or heard from him since—whether he failed in his after experiments, died, or returned to England, I do not know; I have not, however, the least doubt that our soil and climate are well adapted to the culture of this seed; it is of the same family with the cabbage, which every one knows grows luxuriantly here. We have, besides, such a variety of soils and climates in our country, that if it will not succeed in one district it certainly will in some other.

Another seed valuable for oil is the sun flower: I have never tried this, but am told it produces a very excellent salad oil; I have no doubt the culture of it, properly managed would be both useful and profitable.

The bene seed cultivated in the southern states, produces a valuable oil, and yields more than any seed I know of; it is said that one hundred pounds of seed produces ninety pounds of oil. I never tried the experiment fairly, but have no doubt as to the fact; some years since I expressed a barrel of the seed, but do not now remember the quantity produced; it was, however, such as to astonish me. The seed was eight years old, and had become in a manner rotten and rancid; the oil of course was not fit for the table, but it was, never-

theless, beautifully transparent and fluid, more so than any I had ever seen. It struck me that it might perhaps be valuable for watch makers. I believe I have a small quantity of it left, and should like some one who knows more of that matter than I do, to try it.

The common thin-shelled pig nut of our country, is said to make an excellent salad oil; the manufacture of it is easy; the shell is so thin as to interfere but little in the process; the nut is put into the mill, and ground up without removing the shell.

The cotton seed, if hulled, will yield a large quantity of oil, and I am glad to learn that attention is being paid to it. I once manufactured a small quantity, grinding the hull and cotton fibre with it; the quantity of oil produced in this way will not of course pay the expense of manufacturing it, so much of the oil being absorbed by the hull and cotton. Your correspondent does not appear to be practically acquainted with the plan of taking off the hull which he suggests, by means of a barley hulling machine. It is totally impracticable, for the following among other reasons: first, if the result could be accomplished in that way, the expense of power, labour &c. in so doing, would be such as to leave little or no profit; it would, in fact, be much more trouble and expense than all the rest of the process of making the oil: second, the seed cannot be hulled in that way; I speak from experience, being practically familiar with the process of hulling barley; the reason is, that when the grist is put into the machine, and the stone had penetrated through the hull, and come in contact with the soft and greasy parts of the seed, it would become so greased, or to speak technically, glazed, as to render it perfectly incapable of doing any more work; the seed would then come out in pretty much the same condition that it went in. I rather think that a method similar to that which is used in chocolate mills for separating the hull from the cocoa, would be more feasible. The nuts are broken up by being passed through rollers of a peculiar construction, and the shell is afterwards blown out by a common fan. The objections to this plan are, the difficulty of breaking up the

cotton seed, on account of its toughness; the further difficulty, from its adhesiveness, of separating the hull from the kernel of the seed. I have been told that some person at the south has succeeded in making a machine for hulling cotton seed, and I perceive among the list of patents in the Journal for November, one for a machine for that purpose; the description of it, however, is so imperfect that I cannot exactly understand the nature of it. If, as is said, it does hull one hundred and fifty bushels per day, it is an important matter, and the object is attained.

The above remarks have been hastily thrown together, after reading the essay above alluded to; they come from one who is in a measure practically acquainted with the subject, and may perhaps answer some useful purpose.

Manayunk, December 16th, 1833.

Journ. Frank. Inst. Jan'y, 1834.

ART. XIII.—REPORT OF THE COMMITTEE ON PATENT MEDICINES TO THE BOARD OF TRUSTEES OF THE COLLEGE OF PHARMACY OF THE CITY OF NEW YORK.

[As the report of the Committee of the Philadelphia College of Pharmacy on Patent Medicines, has already been given, (Vol. V. p. 20,) it would be mere repetition to insert those recipes adopted by our New York brethren from that report,]

The committee appointed by the Board of Trustees of the College of Pharmacy of the city of New York, on the subject of Patent Medicines, beg leave to report:—

That they have examined a number of recipes for some of the principal patent medicines sold extensively in this city and country. In this examination they have availed themselves of the labours of the Philadelphia College of Pharmacy, and as the formulæ for eight patent medicines, recommended in March, 1824, “to the adoption of their members as the standard recipes of that college,” met with the entire approbation of

your committee, they have copied them, viz :—Hooper's Pills, Anderson's Pills, Bateman's Drops, Godfrey's Cordial, Dalby's Carminative, Turlington's Balsam, Steer's Opodeldoc and British Oil, to which they have added a recipe for Balsam of Honey, all of which they recommend to the adoption of this college as suitable formulæ for the preparation of the several remedies bearing the above titles.

BALSAM OF HONEY.

Take of Gum Bezoïn,	5 oz.
Balsam Tolu,	1 oz.
Honey,	f 8 oz.
Alcohol,	3 pints.

Digest for 10 days and filter.

In these formulæ the weights, measures and preparations of the American Pharmacopœia are adopted.

The directions and recommendations which accompany these medicines, are in some instances of so marvellous and even so absurd a nature, that your committee are of opinion that some reform in this particular is also very much called for. The statement on these directions that the medicine is prepared in London &c., carrying as it does an unexplained falsehood, it would appear proper at least to state that they are now prepared in New York after the formulæ recommended by this college.

Your committee cannot take leave of the subject which they have been appointed to investigate without expressing their decided opinion that measures should be adopted to prevent, if possible, the countenance now so readily given to nostrums, the constituents of which are concealed from the public. They are of opinion, that among the members of this college these secret medicines should be entirely unknown. The number of these pretended medicines are constantly increasing, with perhaps no other merit to bolster them up than the unblushing quackery and marvellous pretensions of their inventors; who for the most part are influenced by the most sordid motives, regardless of the public health. It must be obvious also that it is much against the interest of the regular and qualified dealer to encourage and assist the sale of arti-

cles of this kind, as the profit allowed by the inventors or proprietors is generally much less than on regular prescriptions, and the well established drugs and compounds of the shop, which these nostrums, in a great measure supercede.

By these remarks your committee do not mean to say that new remedies may not be discovered, or new applications of well known materials, or a host of new and useful compounds, now wholly unknown and unsuspected: neither would they infer that the fortunate or scientific discoverer should not reap the benefit of his research. On the contrary they applaud the wisdom of that law which secures to the inventor of new and useful discoveries the pecuniary benefit arising from the exclusive use and profit of the discovery, for a certain term of years, upon his depositing in the patent office a full statement of his discovery, in order that, at the end of the time for which he has, as the reward of his invention, the advantage of exclusive profit, the discovery and its benefit may belong to mankind at large. In defence of this position, it will readily occur to you that many of the most valuable preparations of the pharmacopœia are modifications of patented compounds, found highly useful in the cure of disease.

In order that the members of this college may have the necessary information to judge of the utility of such new compounds, or to discountenance the quackery, where the proposed remedy may be deleterious or useless, we beg leave to suggest the propriety of appointing a committee, or making it the duty of some committee now existing, to obtain from the patent office at Washington, copies of the specifications of all new remedies deposited there, and report them, from time to time, to this college.

All of which is respectfully submitted.

OLIVER HULL,	}	Committee.
JOHN CARL, Jr.		
GEORGE D. COGGERSHALL,		

New York, 5th April, 1833.

ART. XIV.—ON THE MEDICAL USES OF THE VIOLA OVATA.

By STEPHEN W. WILLIAMS, M. D., of Deerfield, Mass.

VIOLA ovata. *Synonym*. *Viola primulifolia*, Pursh. Rattle snake violet. *Specific Description*. It is thus described by Nuttall. Leaves ovate, subcordate, crenate, rather acute, often lacerately toothed at the base; equally and for the most part conspicuously pubescent on either side, petiole margined; scape shorter than the leaves; segments of the calyx subciliate; petals obovate, the two lateral ones bearded. On dry land. Flowers bright blue; flowers in April and May. (North American genera.) I have ventured to give it the English name of rattle-snake violet, from the fact that it is generally known here by the name of the rattlesnake plantain, from its efficacy in curing the bite of that reptile.

Medical use.—The fact which I shall relate with regard to its efficacy in arresting the direful effects of the bite of the deadly rattlesnake may be implicitly relied on. Dr. Wells, when living, was considered one of the most eminent, judicious, and observing physicians which Massachusetts has ever claimed. His medical precepts and opinions are treasured up by many of his successors with religious veneration.

Let it not be objected to the *Viola ovata* that we are not acquainted with the active principle of the plant which thus rapidly arrests the progress of one of the most terrible accidents to which humanity is liable. The principal substance which can be extracted from it is mucilage, and this is best done by infusion in water. It yields a greater proportion of it than any of the violets, and nearly as much as the same quantity of slippery elm, (*Ulmus fulva*;) hence it is much in use in dysentery, diarrhœa, strangury, and other affections of the urinary organs. Other medicinal qualities may reside in the plant, but I have not discovered them. I cannot persuade myself that its specific qualities reside in the mucilage, for other substances yield mucilage in greater abundance, and are not considered alexipharmic. We ought always to be governed by facts rather than speculative opinions. Who can explain the reason why variola vaccina protects the sys-

tem against the ravages of small-pox? and yet who can doubt the fact? If we can establish the prophylactic qualities of the rattlesnake violet upon as firm grounds, or if we can be instrumental in saving the life of a fellow being labouring under the effects of the bite of this venomous reptile, our object will be accomplished.

Many years ago rattlesnakes abounded in the vicinity of this place. Since the land is cleared they are rarely to be seen. Our old people were in the habit of using this violet for their bites. They generally know it by the name I have designated. The venerable Henry Wells, M. D., late of Montague, successfully employed it in these cases. To his statement respecting it I wish to draw the attention of physicians. He was called to a patient who was bitten by a rattlesnake, and who was labouring under all the symptoms of a diffusion of the venom. His body was enormously swoln, respiration laborious, and his skin livid. He immediately directed a strong infusion of the rattlesnake violet, and constantly bathed the wound and body with it. In a few hours the tumefaction subsided, the febrile symptoms abated, and the patient was considered nearly out of danger. He retired to rest, and left directions with the nurse to give the violet tea often during the night. The patient continued so much better that the nurse became negligent, and omitted the directions, and fell asleep. From this suspension of the remedy the patient relapsed, and the febrile symptoms returned, and the body was swoln like a puff-ball. The doctor was called, and again directed the remedy as before mentioned: the symptoms yielded, and from a continuance of the remedy two or three days he completely recovered without the use of any other means. Dr. Wells related the above fact to my father, who was formerly a physician in this town, and at the same time showed him the plant, which my father perfectly recollected when I collected it for preservation in my herbarium.

My grandfather, Dr. Thomas Williams, formerly of this town, was in the constant habit of using a plant for the bite of the rattlesnake, which he called the rattlesnake plantain,

and he was uniformly successful in the use of it. His practice as a physician and surgeon was very extensive. I have no doubt that it was the violet now under consideration.

I have within a few days ceased visiting a little patient who says that a short time before I was called to him he was bitten by a small green snake upon the top of his foot. Not long afterwards he was attacked with pain in his leg, attended with considerable swelling and high fever. I did not see him until he had been labouring under these symptoms some time. When I first saw him I did not apprehend that the fever, tumefaction &c. proceeded from the bite of the snake, for I was not aware that its bite was venomous. I put him upon the antiphlogistic plan of treatment, and applied the vegeto-mineral water to the inflamed leg. The next day I visited him, and found his symptoms aggravated, and the swelling increasing. I threw aside the mineral water, and directed emollient fomentations with the rattlesnake violet, and a poultice made with bran stirred into the liquor of the infused leaves. The next morning I was highly pleased with the success of the applications. The tumefaction had subsided, and the fever abated. I left him under a confident expectation that he would soon recover. In the course of the afternoon, however, an officious, intermeddling old woman sent word to the parents that my applications were improper, and that nothing would cure him but a cold application of the leaves of houseleek, (*Sempervivum tectorum*), which was accordingly applied. The consequence was a universal chill, succeeded by delirium, and an intense burning fever, from which he was not relieved under several days. He was immediately attacked with pain and inflammation in the groin of the other leg, attended with a good deal of swelling. I was immediately sent for, but could not go until the next morning. I directed the violet fomentations and poultices again. In about a fortnight suppuration occurred, and I let out about half a gill of pus upon the tibia, about half way between the knee and instep. The other leg continued swelled three or four weeks longer, when, by the continued application of the violet poultice, it subsided.

I have since used the infusion of this violet, and a fomentation with the leaves of it in an obstinate case of chronic inflammation of the eyes, which had resisted the long continued use of a great variety of remedies. The patient had used the slippery elm and various other mucilaginous preparations with no success; in fact, with rather an aggravation of the complaint. Within a fortnight from the time she commenced with the violet infusion, no traces of inflammation about the eyes remained. So it appears it must be some other quality in the violet than its mucilaginous properties which must have effected the change. I am determined in future to use it extensively in the phlegmasiæ, both acute and chronic.

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ART. XV.—ON CREOSOTE AND PICAMAR. BY M. REICHENBACH.

[Extract.]

Dr. REICHENBACH has lately discovered a new substance in smoke, pyroligneous acid, and all kinds of tar, which he denominates *Creosote*. This substance, which floats on the surface of pyroligneous acid, can only be obtained pure by a complicated process. It is an oil of the consistence of that of almonds, without colour, transparent, strongly refracting the rays of light, and dispersing them even more than sulphuret of carbon. Its smell is penetrating and disagreeable, its taste burning and caustic, its specific gravity 1.037, its point of ebullition 460° F., and it does not congeal at 16° F., its fluidity not being altered at that low temperature; when it is poured upon paper it diffuses itself widely, and forms a greasy spot, which disappears without leaving a trace, in a few hours. A drop placed on a plate of glass, completely evaporated in two or three days. In vacuo, it can be distilled without change or residue. It is a nonconductor of electricity. It has no action on the test papers.

With water it unites in two proportions, one containing $1\frac{1}{2}$ creosote to 100 of water, the other 10 of water to 100 of

creosote. Vinegar of beech wood contains $1\frac{1}{2}$ per cent. of it, and the tar 20 to 25 per cent. On being placed in contact with a great number of electro-positive and electro-negative substances, and with different salts and organic substances it manifests some interesting phenomena. For example, it is a better solvent than alcohol, for the resins, for colouring matters of a resinous nature, and especially indigo, which is not precipitated on cooling. With the white of eggs it instantly forms a solid body. Even when the albumine is dissolved in a large quantity of water, a drop of creosote will become surrounded with an envelope of hardened albumine, and fall to the bottom. It acts in the same manner on the serum of the blood, immediately concreting the albuminous portion, and enveloping the colouring portion, but without acting on the fibrine.

Fresh flesh plunged in a watery solution of creosote, and taken out in half an hour or an hour and dried, can afterwards be exposed to the action of the air and heat of the sun without fear of putrefaction. It becomes entirely dry in about eight days, when it is hard, brittle and possesses the smell of smoked meat. Creosote is doubtless the element which acts as a conservative principle on animal matters, when they are exposed to the influence of smoke, pyroligneous acid &c.

Pure creosote acts on animals and vegetables as a poison. The author has not yet made a quantitative analysis of this singular substance, but, from some experiments, judges that it is a hydrocarbonated body, surcharged with carbon, without azote, and perhaps without oxygen. Decomposed in a red hot porcelain tube, it afforded among other products, beautiful crystals of naphthaline.

From the experiments of Dr. Reichenbach, it appears that creosote may prove eminently useful. As mentioned above, a solution of $1\frac{1}{4}$ of creosote in 100 of water will completely preserve meat from putrefaction. Even flesh which already exhales an unpleasant odour, is rendered sweet by plunging it for an hour in the solution of creosote. Fish can be admirably preserved in this way. Salted meat is much im-

proved by this process. The only disadvantage attending its use is the strong taste and smell of smoke which adheres to meat thus prepared; this, however, it is thought may be removed by vinegar.

The various properties possessed by this substance induced Dr. Reichenbach to suspect that it entered, as an integrant part, into a great number of thereapeutic agents, as Dippel's animal oil, tar water, the empyreumatic oil of Chabert &c. There has also been lately sold, at a very high price, a liquid imported from Italy, under the name of *Aqua Binelli*, which has the property of arresting hæmorrhages from the smaller vessels. Several chemists have attempted to ascertain its constituents, but without success, and Berzelius himself, in a letter to Mr. Græfe confesses, that notwithstanding the empyreumatic and ammoniacal smell of this liquid, that he found it impossible to form an exact idea of its origin, and that the substance in solution was unknown to him. The discovery of Dr. Reichenbach seems to throw some light on this question, and the peculiar action of creosote, even when in solution, on the serum and other parts of the blood, renders it very probable that the *Aqua Binelli* is nothing more than this substance dissolved in water, and united to some other of the products of a distillation of organic matters.

The same may be said with regard to the hemostatic liquids used in France and other countries. In Germany, a medicine prepared at Breslaw, and known under the name of *aqua empyreumatica*, is much used in diseases of the nervous system. It is prepared by saturating pyroligneous acid with chalk. This solution is subjected to distillation till half has passed over into the receiver. This is the *aqua empyreumatica*, and which, there can be no doubt, owes its properties to the creosote it holds in solution. Probably this article would be equally efficacious with the *aqua Binelli* to arrest hæmorrhages.

Dr. Reichenbach has tried the effects of creosote, both in a pure and diluted form in a variety of diseases, as cancerous affections, mortification, and caries; in the latter he has had the most astonishing success.

The same chemist has also discovered another product of the distillation of organic substances, which appears to be the bitter principle of pyroligneous acid, smoke and tar, and which he terms *Picamar*. This substance which crystallizes immediately when united to the alkalies, even with liquid ammonia, has some very peculiar properties.

Memor. Encyclop.

ART. XVI.—INFLUENCE OF COLOURS ON THE ABSORPTION OF HEAT, AND OF ODOROUS PRINCIPLES.

Read before the Royal Society, by JAMES STARK, M. D. of Edinburgh.—Extract.

The author observes, that the only experiments on record relating to the modifying effect of different colours on the absorption of heat from solar light, are those of Franklin and Sir H. Davy. In order to investigate this subject, the author employed pieces of wood, silk, and cotton, which were wrapped round the bulb of a thermometer placed in a glass tube; the tube was then plunged into boiling water, and the time which elapsed during the rise of the thermometer from one given point to another, was accurately noted. Other experiments were also made with an air thermometer, of which the bulb was coated with various coloured materials, and heat thrown on the ball by means of polished tin reflectors from an Argand burner. The results accord very nearly with those of Franklin and of Davy, the absorbing power with regard to different colours, being nearly uniformly in the order of black, brown, green, red, yellow, and white. The author next investigates the differences which occur in the radiation of heat by differently coloured substances, a subject on which he is not aware that any experiments have ever been made previously to his own. The mode of ascertaining the amount of radiation was generally the converse of that by which the absorption of heat had been determined; namely, by exposing the coloured substances, in contact with a thermometer, to cooling instead of heating processes. The general result of all his experiments was, that the loss of caloric by radiation follows exactly the same order, with regard to the colour

of the radiating surface, as its absorption. In the second part of this paper, the author gives an account of a course of experiments which he made with a view to discover the influence of colour on the absorption of odorous effluvia, and more especially in the case of the absorption of the fumes of camphor and assafœtida by woollen cloth of different colours. Black cloth was always found to be possessed of the greatest absorbing powers, and white of the least; red cloth being intermediate between them. Cottons and silks gave, on trial, precisely the same results, which were further confirmed by the different weights acquired by these substances from the deposition of camphor upon them.—*Proceedings of Royal Society.*
[*Rep. Pat. Inv. and Journ. Frank. Inst.*

ART. XVI.—ANALYSIS OF AMERICAN COLOGNE EARTH.

BY THOMAS G. CLEMONS.

[Read before the Geological Society of Pennsylvania.]

THERE exists, near Philadelphia, on the land of Dr. Parrish, considerable quantities of a substance which has the following properties. It is found in amorphous masses, of a dark brown colour, having an earthy fracture, may be cut with a knife, which gives a waxy or resinous lustre to the parts separated, a lustre which may be obtained more perfect by burnishing. It is susceptible of being reduced to an impalpable powder. The vestiges of vegetable fibre have not yet entirely disappeared from it, proving its vegetable origin. When exposed to heat, the ordinary products obtained from organic distillation, are given off.

Ten grammes of a portion previously dried to 100° centigrade, (212° Fah.,) were calcined in a close crucible; the loss in water and bituminous matter, was 3.4 grammes. The remaining 6.6 grammes, were then heated, and at the same time exposed to the air. The earthy residuum weighed 5.57 grammes. From this, the composition in parts of unity is as follows:—

Volatile matter 0.340, Carbon 0.103, Cinders 0.557, = 1.000.

The cinders, or earthy matter, left after roasting were coloured of a reddish orange hue, owing to the presence of a little oxide of iron ; it might thus be employed as a pigment.

When in its natural state, and pulverized, it gives a fine brown colour, with all the intermediate shades between a dark and light brown, and may be used with glue or with oil, either of them drying and covering well. After calcination in close vessels, it is perfectly black, and might be used as a black for ordinary purposes, being peculiarly well adapted, when properly mixed, to the coating of iron for preventing oxidation, to ship painting, or the various applications of black pigments used in dressing ships. The small portion of carbon, and the excess of earthy matter, will be obstacles to its being employed as a combustible ; however, experiment may prove its utility in burning lime, bricks, and in those cases where slow evaporation is required. A use which might grow out of its property of taking a polish under pressure and friction combined, would be that of painting paper, as a varnish upon stained papers very much increases their value. This matter might be employed to colour, and being susceptible of a lustre, would not require a varnish. The polish upon the French playing cards is obtained by rubbing the card with a little Marseilles soap, and then burnishing.

If employed alone, as a manure, it would not be attended with ameliorating effects, owing to its inalterability, but in a compost mixed with dung or lime, in the proportion of about one part of either of these substances to four or five of this matter, a fermentation would most probably ensue.

Another specimen of a perfectly similar substance was handed me for examination by Capt. Wm. Pell, and is found on his farm near New York, possessing all the properties of the preceding, save that the vegetable fibre in this case has entirely disappeared ; like the former, it gives off the characteristic odour of peat when burning. It contains—

Volatile matter 0.201, carbon 0.030, cinders $0.769=1.000$.

The ashes were of a dirty gray colour ; the preceding observations are probably applicable to this second substance.

Journ. Franklin Institute.

ART. XVIII.—ON PLANTS FURNISHING BLUE DYES.

By M. DIERBACH.

COLOURING substances of a vegetable origin, are either of a resinous nature or are modifications of extractive matter. Among the resinous colours some are yellow as turmeric, gamboge, chica &c.; some red, as madder, dragon's blood, red saunders, safflower &c.; and some green, as chlorophylline, but it does not appear that there are any blues.

The blue colouring substances are generally of an extractive character; some of these extractive matters are also yellow as quercitron bark, fustic and many others, some red as alizarine, hæmatine &c. but there are no greens.

Vegetable blues may be divided into two sections. A. Blue colouring matters furnished by flowers and fruit, especially from the latter. These may be termed natural blues, because the colour is already formed during the life of the plant, as in the petals of the *Viola odorata*, *Iris germanica*, *Commelina communis*, *Sisyrinchium tinctorium*, *Aquilegia vulgaris*, *Centaurea cyanus*, *Campanula rotundifolia*, and a multitude of others. This colour also exists in the juice of the berries of the *Sambucus nigra*, in that of some varieties of the *Vitis vinifera*, in that of the *Vaccinium myrtillus*, *Rubus cæsius*, *Empetrum nigrum* &c.

B. Blue colouring matters furnished by the organs of nutrition from the root, the stem and the leaves. The colour is rarely primitive and formed during the life of the vegetable; it appears to be formed only after the death of the plant by chemical combinations, whence the name of chemical blues which have been given to these substances; to this section belongs the indigo of commerce. In the LEGUMINOSÆ, blue colouring matter is afforded by the *Coronilla emerus*, *Vouapa simira*, *Baptisia tinctoria*, *Tephrosia tinctoria*, *Amorpha fruticosa*, *Robinia caragana*, *Ononis anil* and many others; in the POLYGALEÆ, by the *Polygala bracteata*, Forsk. and *P. tinctoria*, Vahl, affording a kind of indigo; in the CRUCIFERÆ, the most celebrated plant in this particular is the *Isatis tinc-*

toria, a blue colour can also be obtained from the leaves and stem of a variety of the *Brassica oleracea*, and the bark of the root of some kinds of the *Raphanus sativus*.

In the ACERINEÆ from the *Acer rubrum* which is used in America to dye cotton and wool; in the SYNANTHEREÆ, from the *Spilanthus tinctoria*, Loureiro, from which the inhabitants of Cochin China derive a dye closely allied to indigo. It is probable that a similar substance might be obtained from the *S. oleraceus*. In the POLYDONEÆ, from the *Polygonum fagopyrum*, if dried before the seeds are ripe; according to Thunberg, the *P. chinense*, *P. barbatum* and *P. aviculare* are cultivated in Japan, as plants affording a tinctorial substance of a rich blue, resembling indigo.

In the APOCYNÆ, the *Pergularia tinctoria* from Sumatra, the *Gymnema tingens*, Sprengel, *Asclepias tingens*, Roxburgh, from Pegu, and the *Wrightia tinctoria*, Brown, *Nerium tinctorium*, Roxburgh, give highly esteemed blue dyes. In the LAURINEÆ, the roots of the *Laurus parvifolia*, Lamark, and of the *L. globosa*, Aublet, afford a violet colour.

In the EUPHORBIACEÆ, the *Crotophora tinctoria*, A. Jussieu, from which litmus is obtained, and the *Croton tricuspidatum* and *C. lanceolatum*, Cavanilles, give a blue; the common *Mercurialis perennis* contains a notable quantity of colouring matter, and the *Euphorbia helioscopia*, L., is used to stain paper of a sky blue. In the TEREBINTHACEÆ, the *Rhus mollis*, Humboldt and Bonpland, and the *Melampyrum arvense*, L., in the SCROPHULARIÆ, also give a good blue colour, as does also several species of *Rhinanthus* and *Euphrasia*.

It may finally be remarked that what only takes place after death in these phenogamous plants, occurs during life in some lichens and Boleti, which turn of a blue colour on being cut or bruised.

Ann. der Pharm. 1833.

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Minutes of the College.

November 26, 1833.

The Board of Trustees reported the election of John W. Swain, of New Orleans, as an associate member.

December 31, 1833.

A letter of resignation from Isaac P. Morris was read and accepted on the usual terms.

A donation from M. Faraday, Esq. of his "Experimental Researches on Electricity," was received, and referred to Messrs. J. Scattergood and J. C. Allen to report thereon.

A donation was also received from Professors Wood and Bache, of the second edition of their United States Dispensatory, which was referred to Messrs. Wm. Hodgson, Jr. and E. Durand.

A communication on Egyptian Opium, from J. Scattergood, was read and referred to the author and Wm. Hodgson, Jr.

The committee of inspection were, on motion, requested to examine and report on certain opium offered in this market, supposed to be not genuine.

January 28, 1834.

The committee to whom was referred "Experimental Researches on Electricity," made a report, which was accepted.*

The committee of inspection made the following report:—

That there appears to have been three lots of opium brought here, two from New York and one direct from the Mediter-

* The great length of this interesting report, prevents its insertion at the present time.—ED.

anean, which claimed the attention of the committee. Samples of two of the parcels are herewith submitted. Of the third lot which was small, and none of which now remains in the market, the committee obtained no specimen.

No. 1. Imported into this city from Leghorn, and sold as Egyptian opium, corresponds with M. Guibourt's description of that article in the following particulars:—It is in round, flattened lumps, generally smaller than those of Turkey opium, tolerably regular in their form and very clean upon their surface, appearing to have been covered with a leaf of which vestiges alone remain. This opium is easily distinguished from the Turkey by its reddish colour, analogous to that of hepatic aloes, by its weaker odour, and being more adhesive when moistened. It differs from the descriptions we have of the true Egyptian opium, in having a less shining fracture and in containing much less morphia; and although the committee are not prepared absolutely to pronounce this to be a fabricated and spurious article, as it approaches so closely to the descriptions we have of Egyptian opium, in most of its characteristics, yet from its great inferiority in strength when compared with the best specimens of genuine Turkey opium, your committee cannot view without regret the attempt to introduce so inferior a substitute for one of the most powerful and valuable articles of the *materia medica*.

No. 2, was received in this city from New York, and the committee have been unable hitherto to learn the history of its origin. It is evidently an inferior article, resembling in some respects the Benares opium occasionally brought to this market from the East Indies; it has most of the smell, taste and irregular granulated fracture of the Turkey opium, but differs in being of a much darker colour internally, and in externally presenting a totally different appearance. It is entirely covered with a peculiar whitish gray crust, and presents an appearance as if the lumps, to prevent their adhering together, had been rolled in some kind of moistened clay and then dried.

The committee have ascertained from a manufacturer, who operated on both of them, that its product of morphia is about

fifteen per cent. less than that of good opium, and when to be had at a reduced price is by no means a disadvantageous article for the operative chemist. It is to be hoped, however, that it may not be introduced in any instance as substitute for the genuine Turkey opium, in any of the officinal preparations of that drug, except for the manufacture of morphia, as it is evidently a weaker and inferior article: about 300 lbs. have been sold here.

No. 3, consisted of less than 100 lbs. of inferior Turkey opium, selected from a case of a merchantable article brought from New York. M. Guibourt, in describing Smyrna opium, observes that it is sometimes mixed with a kind of opium in balls or round masses, which are hard and of an inferior quality; from what the committee can learn, they believe this parcel to have been of this identical character, presenting an appearance of inferiority, and sold at a less price.

WARDER MORRIS, } Committee
ELIAS DURAND, } of
CHARLES ELLIS, } Inspection.

A communication from Wm. Hodgson, jr. on the Adulteration of Oxide of Zinc, as usually found in commerce, was read and referred to the committee of publication.

February 25, 1834.

The committee to whom was referred the second edition of the United States Dispensatory made the following report:—

TO THE COLLEGE OF PHARMACY.

THE Committee on the second edition of the U. S. Dispensatory, report:—

That they have given this edition a careful examination, with a view to ascertain the emendations or additions which have been introduced. They find it indeed, as the authors themselves say, by no means “a mere reprint of the first edition;” but apparently the result of a careful and minute revision of the whole work. Many of the articles have received corrections or additions, in particulars more or less important, and some are entirely altered in their charac-

ter. We find also several new articles scattered through the body of the work, among which may be pointed out those on Coffee, Tannin and Tea, as possessed of considerable interest. The treatise on *Gum Arabic* is one of those which have received very material modifications, chiefly the product of recent researches, as obtained from several German authors of acknowledged authority. It will not be expected that your committee should enter into a detail of these alterations; but they will merely say, that they appear greatly to add to the practical value of the article on this subject.

Under the head *Acidum Arseniosum*, the authors have introduced the results of some experiments recently made by Dr. John K. Mitchell, and our Foreign Secretary, and published in the Journal of the College.

The article on *Citric Acid* has received a small addition in a notice of the falsification of this acid by the tartaric.

The notice of *Aconitum* is entirely altered, on the authority of Geiger, and this drug attributed to the *Aconitum napellus*, instead of the *A. neomontanum*, as in the former edition.

The articles on *Althæa* and *Alum* have received considerable accessions.

Other alterations and additions might be enumerated, if necessary, to show the superiority of the present edition of this work.

But the elaborate treatise on *Cinchona* has received the most valuable accessions, in a series of descriptive notices, taken chiefly from Von Bergen's splendid Monograph of the Cinchonas, from Guibourt, and from Geiger's *Handbuch der Pharmacie*; and which are of very considerable value to the druggist and manufacturing chemist, inasmuch as they contain more minute descriptions of the different varieties of pale, yellow and red barks, and of the proportions of cinchonia and quinia contained in them respectively, than was before to be found, so far as your committee are aware, in any work in the English language.

The copiousness of the first edition left, perhaps, little to be desired in regard to the number and variety of articles composing the materia medica and strictly officinal preparations of

our own or foreign pharmacopœias ; yet the physician, as well as the apothecary, could occasionally complain that some substances, either newly introduced and not yet possessed of established reputation, or of ancient date, though not quite obsolete, were to be sought in vain in its pages. To supply this deficiency, we here have an Appendix of forty-six very closely printed pages, containing notices of upwards of 200 articles not strictly officinal with us, that is, not designated in the United States or British Pharmacopœias. This appendix, in the estimation of the committee, is highly valuable ; and they cannot refrain from adverting to a few of the articles composing it, as possessing particular interest.

Asparagus officinalis.—We are glad to see the sedative powers of this vegetable here vindicated. The authors mention a syrup prepared from the berries. We would take the liberty of intimating that a very fine extract may be prepared also from the berries, which appears to contain the active principle in a more convenient form.

Cheltenham Salt, artificial.—Under this head we find a notice of the formation of an artificial salt by one of our foreign members, the interest of which, as an instance of a successful and completely accurate imitation of a natural mineral water, will sufficiently warrant the introduction of the following extract from the description here given:—"Several artificial mixtures have been prepared, professing to be exact imitations of the saline ingredients in the chalybeate Cheltenham water ; but the only one which appears worthy of confidence is that prepared by Robert Alsop, chemist, of London. The Cheltenham water, the composition of which is given at p. 104, under the head of *aqua*, is the pure *saline* of that name ; but there is also a *chalybeate* Cheltenham water, and it is this that Mr. Alsop has so successfully imitated. According to Brande and Parkes, the natural chalybeate contains in the pint, carbonic acid 2.5 cubic inches ; chloride of sodium (common salt) 41 grs. ; sulphate of soda 22.7 ; sulphate of magnesia 6 ; sulphate of lime 2.5 ; carbonate of soda 0.5 ; oxide of iron 0.8 : total 73.8 grains. The imitation of Mr.

Alsop, as analysed by Mr. Faraday, one of the first chemical authorities in London, contains the same solid and gaseous contents, except the sulphate of lime, which is very properly omitted; and in the same proportions precisely, with the exception that there is about twice as much free carbonic acid in the artificial preparation. The iron is present in the state of protoxide, and is immediately dissolved by the free carbonic acid, upon adding a sufficient quantity of water to the mixed salts. The free carbonic acid probably exists as such in the dry mixture, as there is no obvious agent present to cause it to be disengaged in the mere act of solution."

The article on *Chlorine Ether*, a substance discovered almost simultaneously by Samuel Guthrie of Sackets Harbour, New York, and by the French chemist Soubeiran, and lately introduced into medical practice, possesses considerable interest. The same may be said of the notice of *Muriatic Ether*, though as a medicine the latter substance is, from its extreme volatility, not likely to come into general use.

Iodide of Zinc is noticed as affording a convenient preparation for some astringent injections, when employed in solution in the proportion of a grain to the fluid ounce of water.

LIQUIDAMBAR styraciflua.—The peculiarly agreeable balsam obtained from this tree, in the warmer climates of the United States, claims a more extended reputation than has hitherto been granted to it; and we are glad to see it brought into some notice in this appendix. It is certainly one of the most fragrant vegetable products of this continent, and appears to merit further investigation in a medical point of view.

The above are a few of the most prominent articles of the appendix, in addition to which the committee would point out the notices of *Cocoa*, *HYDRASTIS canadensis*, *PELLANDRIUM aquaticum*, *Pæony* root, *SAPONARIA officinalis* and *Zedoary*, as of decided and obvious value. Indeed they regard this portion of the work as a very important accession to its practical usefulness, both to the physician and pharmacist; and they may be allowed, in conclusion, to observe, that on a

comparison of the whole book with the former edition, they have found abundant evidence of the acute vigilance of the authors, and their unremitted anxiety to furnish to the medical and pharmaceutical communities a comprehensive manual, in equal advance with the present state of science, and honourable to the school of pharmacy of Philadelphia.

WM. HODGSON, Jr. } Committee.
E. DURAND, }

Philadelphia, 2d mo. 24, 1834.

A letter of resignation received from Caleb Ash, was read and accepted on the usual terms.

Miscellany.

Test for chlorine in bromides.—M. Caillot proposes the chromate of potash as a test for the presence of chlorine in the bromides. This salt decomposes the bichloride, but has no action on solutions of the bibromide of mercury. The bromide to be tested, therefore, decomposed by a salt of mercury, and brought into the state of bibromide of mercury, as, for example, by subliming it with sulphate of mercury, mixed with a little peroxide of manganese, is dissolved in water and tested with a few drops of chromate of potash. If any bichloride be present, a number of small red points of chlorate of mercury are immediately deposited.

Læwig has proposed another mode. The dry mixture of chloride and bromide is heated in a stream of chlorine gas, and the vapours made to pass through caustic potash, by which chloride of potassium and chlorate and bromate of potash are formed. A solution of nitrate of silver precipitates the chlorine and bromic acid. A solution of caustic barytes digested on the moist precipitates, takes up the bromic acid only. The excess of barytes is separated by carbonic acid, and the bromate of barytes obtained by evaporation; or the barytic solution may be neutralized by nitric acid, and the bromic acid precipitated again by nitrate of silver.

Report to Brit. Association, 2d meeting.

Potash from felspar.—Fuchs has proposed to prepare potash for commercial purposes from felspar and mica. These minerals are to be reduced to powder, calcined in a furnace with quick lime, and afterwards exposed to air and moisture for some time; the alkali is then washed out. By this process, felspar should give about one-fifth of its weight of potash.

Ibid.

Lime.—Mr. Andrews has given a very simple method of detecting the presence of barytes or strontian in lime. The whole is dissolved in nitric acid, evaporated to dryness, and the acid expelled by heating to redness in a platina crucible. The caustic residue is boiled with water, when the whole of the barytes and strontian and a little of the lime are dissolved. Sulphuric acid added to the solution shows if any of these two earths are present, while a boiling saturated solution of sulphate of strontian troubles it if it contains barytes, but causes no precipitate if the earth be strontian.

Ibid.

Oxide of Zinc.—M. Haldat has obtained crystals of oxide of zinc, of a honey colour, almost transparent, and of a rhomboidal form, by heating metallic zinc in an atmosphere of aqueous vapour, cautiously regulating the heat so as not to fuse the metal. By a similar process he has obtained minute groups of brilliant rhombohædral crystals of specular iron, equal in lustre and play of colour to that from Elba.

Schindler has also shown that a hydrated oxide of zinc may be obtained in crystals by uniting a rod of iron and zinc, and placing them in caustic ammonia in a close vessel. Gas is generated, and in a few days the inside of the vessel is covered with small transparent crystals, which are permanent in the air and consist of zinc 81.62, water 18.36.

Report to British Association, 2d meeting.

Gallic Acid.—Döbereiner obtains pure gallic acid in a few minutes by the following process:—A concentrated decoction of gall nuts, mixed with a little acetic acid to decompose the gallate of lime, is shaken for one minute with a quantity of ether. The gallic acid is taken up by the ether, and by spontaneous evaporation in a watch glass, is obtained in small colourless prisms. If longer digested the liquid separates into three portions. The lightest contains the gallic and acetic acids, if the latter be present in excess; the next, an ethereal solution of tannin, and the heaviest the water and extractive matter.

Ibid.

Vegetable Alkalies.—Duflos has published a series of interesting researches on several of the vegetable alkalies. He has observed that bicarbonate of potash precipitates narcotin, but not morphine, and upon this property has founded a process for preparing them. He has also increased our knowledge regarding brucine and strychnine, and improved the process for extracting them from the nux vomica. He separates the two alkalies by digestion in absolute alcohol, which takes up most of the brucine, and afterwards boiling in water as long as a brown colour is imparted to the cold solution by a few drops of fuming nitric acid. This test is so sensible, that water is tinged when it contains only 1-12000 of its weight of brucide. Quinine he finds to fuse at 248° F., losing 4½ per cent. of water; while cinchonine requires a temperature of 329° F., loses nothing, and is partly sublimed into crystals resembling benzoic acid.

Ibid.

Mode of testing Peruvian Bark.—The following method of testing Peruvian bark, given by Duflos, is highly deserving of attention. A drachm of the bark, finely powdered, is boiled for a few minutes with an ounce of water and half a drachm of concentrated acetic acid, the whole thrown on a filter, the residue washed with water, and the whole evaporated to dryness on a water bath. If the mass be still acid, it is dissolved again and evaporated, to drive off all the acetic acid, the dry mass is digested

in absolute alcohol, the solution freed from colouring matter by animal charcoal, and precipitated by bichloride of platinum, added drop by drop, as long as any deposit takes place. The precipitate washed, dried in the air, and weighed, corresponds to half its weight of the vegetable alkali. The precipitate is soluble in water, and is a double salt, consisting of one atom of bichloride of platinum with one atom of a muriate of the vegetable alkali.

Report to British Association, 2d meeting.

Test for Cinchonine in Sulphate of Quinine.—Kindt gives the following method for detecting the presence of cinchonine in sulphate of quinine. A grain of the salt in fine powder is shaken with one drachm of ether, and a drachm of ammonia is added, and the whole well shaken. If no cinchonine be present, the line of separation between the two fluids is clear; if the smallest quantity be present, it is deposited at this line.

Ibid.

Atropine—Hyoscyamine.—Brandes states, that if leaves of belladonna be distilled with water and caustic lime, a liquid passes over, which, besides the smell of ammonia has also that of the fresh plant. By saturation with muriatic acid, evaporation to dryness, treating with alcohol, evaporating this solution, and distilling the dry mass with a little water and caustic lime, an alkaline poisonous liquid is obtained which in the open air speedily decomposes.

Ibid.

Lactic Acid.—Mitscherlich gives the following process for preparing pure lactic acid. Lactate of lead prepared in the usual way, is decomposed by sulphate of zinc, the sulphate of lead separated, and the lactate of zinc crystallized by evaporation; at first it is yellow, but by repeated crystallizations is obtained of a pure white. The solution of this lactate decomposed by caustic barytes, the oxide of zinc separated, and the lactate of barytes which is in solution decomposed by sulphuric acid and evaporated, gives a clear colourless syrupy acid not volatile, but decomposing and leaving a residue of charcoal when heated to a sufficiently high temperature.

Ibid.

Bubuline.—Morin has extracted from cow dung a substance to which he has given the name of bubuline, and which he considered to be the ingredient to which the utility of cow dung as a mordant is owing. It is obtained by taking up the soluble parts with water, evaporating to dryness, treating the extract-like matter with ether and alcohol, after which water dissolves the bubuline. It is precipitated by alum, by acetate of lead and by sulphates of copper and iron. The soluble matter in dry cow dung amounts to about 20 per cent., of which the bubuline constitutes upwards of one-fourth.

Ibid.

Naphthaline.—Brocke has shown that naphthaline may be prepared in large quantity by distilling coal tar with water, chloride of lime and sulphuric acid.

Report to British Association, 2d meeting.

Elardic and Palmic Acids.—Fat and drying oils are distinguished by the remarkable property first noticed by Pontet—that when mixed with an acid nitrate of mercury, or with hyponitric acid in small quantity, they speedily become solidified. Boudet has lately investigated this subject, and found the solid thus obtained to possess peculiar properties. He has proposed, for that obtained from olive oil, oil of almonds, cocoa nuts &c. the name of *Elardine*, and for that obtained from palm oil, *Palmine*. Alkalies changed these substances into elardic and palmic acids respectively, and glycerine. Muriatic acid separates the acids from the alkalies in the form of an oil which solidifies on cooling. They possess decided acid properties, and may be distilled without decomposition. *Ibid.*

Bismuth expansion of, on becoming solid.—Marx has established a very important fact, in regard to melted bismuth. He finds that at the moment of solidifying, it expands 1-53d of its volume. He considers also, that like water it has in the fluid state a point of maximum density. Antimony and lead do not expand at the moment of congelation, as was formerly supposed, so that water, bismuth and cast iron, are the only bodies which possess this property; and in regard to cast iron it is still doubtful.

Zinc contracts greatly; potassium also contracts, and arsenic at least three times as much as bismuth expands, if we may judge from the fact, that a mixture of one fourth of its weight of arsenic prevents bismuth from expanding on becoming solid. *Ibid.*

Dried Herbs.—Mr. Lindsey, the intelligent manager of the gardens at Chiswick house, has just presented to the Medico-Botanical Society some very beautiful and well preserved specimens of dried plants and herbs, retaining in a peculiar degree the whole of the volatile oil and aroma, and the colour of the recent plant. The plan adopted by Mr. Lindsey is to dry the plants in a close and dark room, and not as is usually the case, by exposure to a current of air and the action of light. When the separation of the aqueous particles is effected by their evaporation, and they are tolerably dry, he submits them to pressure in small quantities enveloped in paper, until the oil appears on the surface, and which is known by its discolouration; by this, all change of colour by the action of light, or further loss of volatile matters by evaporation, is prevented. In potherbs, as well as medicinal plants, the improvement and superiority is very decided. *London paper.*

Palm Oil.—This substance may be deprived of its orange colour by the following process, given by M. Michaelis:—A certain quantity of the coloured oil is to be melted in a copper vessel over a mild fire; when it is quite liquid, one-sixteenth of its weight of finely pulverized peroxide of manganese is to be added to it. The oxide and oil kept over a moderate fire for five or ten minutes and continually stirred; boiling water equal to half the weight of the oil is to be added, and the whole boiled, after which one-thirty-second part of the sulphuric acid of commerce is to be very cautiously and gradually mixed with it; after stirring for some time, the mixture is to be permitted to cool. The oil collects at the top, whilst the peroxide of manganese sinks to the bottom. This oil has a yellowish colour, which, if the operation has succeeded properly, has a green tinge like olive oil; on being subjected to the action of the air and light, it soon becomes as white as hog's lard. When employed to make soap, it gives a very white product, and when burnt does not clog the wick with charcoal, as is the case before it is purified. *Poggen. Annal.* 1833.

Disinfecting Powder.—The following process is recommended by Keist, of Berlin, for the preparation of a powder, which from the property it enjoys of giving off oxygen and acetous vapour, for a long time, is well calculated as a disinfecting agent. Take acid sulphate of potash 410 grammes, subacetate of lead 70, manganese 30. Reduce these three substances, separately, to a fine powder, mix them in a proper vessel. These quantities are sufficient for the purification of a large room.

Pharm. Centralblatt. 1833.

Purple Powder of Cassius.—The following method of preparing this beautiful colour is extremely simple and always successful. Neutral chloride of gold in crystals, obtained by evaporating a solution of gold in aqua regia, is to be dissolved in 500 or 600 times its weight of pure water, to which is to be added two, three, four or five per cent. of fuming hydrochloric acid, according as the colour is wanted of a lighter or darker shade. In this solution is there to be placed a rod of pure tin. After the expiration of a few days, the purple is precipitated and may be separated by the filter or by decantation. The tint of the purple depends on the quantity of free acid in the solution, being pale in proportion as the acid is in excess.

Journ. Fur. Tech. Chem. No. 3.

Purification of Linseed Oil.—The mode of purifying linseed and other oils, by means of sulphuric acid, washing with water and filtration, devised by Thenard, presents some serious difficulties in practice. First, the operation requires a large establishment and much time; secondly, it is sometimes very difficult to remove all the sulphuric acid used to purify the oil; finally, the oil retains much water, which can only be driven off by the application of a high temperature. A manufacturer of oils in Ger-

many has proposed to treat the vegetable oils in the following manner:— They are to be mixed with sulphuric acid and well stirred, and then permitted to stand till all the black flocculæ are deposited. A thick mixture of chalk and water is then to be added in small portions, stirring the mass well after each addition. When chalk sufficient to saturate the acid has thus been mixed with oil, this latter is to be poured in vessels, to permit the precipitates to fall to the bottom. After standing some hours, the oil is to be filtered. By this plan all the washing is avoided, an operation that requires ten or twelve days, and no loss is experienced, as the chalk, from being previously saturated with water, does not absorb any oil.

Memorial Encyclop.

New Orange Colour.—Take two parts by weight of sulphate of barytes, one part of sulphuret of antimony of commerce, and one part of dry charcoal. Pulverise these three ingredients very finely, and mix them thoroughly. This mixture is to be firmly pressed into a black lead crucible, which should have a cover; the crucible is to be placed in a furnace and kept at a red heat from one and a half to three hours according to its size. It must not be opened until it is entirely cool, as the sulphuret of barium and charcoal would immediately take fire. The cooled mass is to be pulverised, mixed with boiling water, and the solution filtered. The carbonaceous matter remaining on the filter is to be well washed with warm water, and after drying can be used for another operation. The filtered liquid is of a pale yellow. Sulphuric acid is to be added to it as long as any orange precipitate takes place. This precipitate is collected, carefully washed with pure water, and dried slowly. The great secret in the manufacture of this colour is the management of the fire, as the heat should not be used longer than is merely sufficient to the decompose the sulphate of barytes, otherwise there is a great loss of materials. With five pounds of sulphate of barytes, two and a half of antimony and of charcoal, two and three quarters pounds of colour are obtained at the first operation. This colour covers well, and gives brilliant tints.

Ibid.

Formation of Crystals of Sulphuret of Lead.—It is well known that sulphuret of lead, or galena, is volatilised at a certain temperature, and by sublimation affords octahædral or cubical crystals. Hence it was supposed that the veins of this substance found in the earth had an igneous origin, but as galena is found in all formations, even the most recent secondary, whose aqueous origin is fully established, there can be no doubt but that it must have been produced in the same manner. Hitherto, however, chemistry had pointed no mode in which crystals of sulphuret of lead could be formed in the moist way. M. Becquerel, who by aid of electro-chemistry, had succeeded in imitating many natural compounds, which had hitherto never been artificially formed, conceived the idea of

employing the same method with galena, and was completely successful. He took a tube closed at one end, of about a quarter of an inch in width and four inches long. The lower part of the tube was filled for about one-eighth of an inch with sulphuret of mercury, on which was poured a solution of chloride of magnesium, and a strip of lead introduced. The apparatus now was hermetically sealed, and remained undisturbed for a month or six weeks, at which time crystals of a regular tetrahædral form made their appearance, having all the properties of galena.

Memorial Encyclop.

New Chlorometer.—This consists, according to its proposer, M. Pouillet, in adding to the solution containing chlorine, a certain quantity of powder of silver obtained by precipitation; there is instantly a formation of chloride of silver, which precipitates and becomes mixed with the excess of the metallic powder. If this powder be weighed before the experiment, and again afterwards, the augmentation of its weight will exactly represent that of the chlorine in the liquid. If the chlorine, instead of being in a free state, is in combination with an oxide, forming a chloride, the powder of silver will still absorb it, but more slowly; the operation may be hastened by acidifying the solution with an acid capable of forming a soluble salt with the base of the chloride, as the hydrochloric or acetic. This mode will enable any one to estimate exactly the quantity of useful chlorine in the alkaline chlorides so generally employed in the arts as disinfectors. A comparison of this mode with that of Gay Lussac, proves that we constantly obtain from one-fifth to two-fifths more chlorine by the latter than by the former. This has led M. Pouillet to conjecture, that the indigo proof used may sometimes be badly prepared, or undergoes alterations. The liquid chlorides, as the *eau de javelle* and chloride of soda, from the best makers, never afforded the author more than thirteen grammes or four litres, .903 of chlorine in the chloride of soda, and six grammes or one litre .903 in the *eau de javelle* to the litre of chloride.

Ibid.

Extract of Logwood.—This article is prepared in Mexico and Yucatan in considerable quantities, and does not appear to deteriorate by age or atmospheric influence. Ten or twelve pounds of it are equal to about a hundred of the wood. Thus, a case two feet long, by fifteen inches in breadth and six in depth, weighing eighty pounds, will represent six hundred and sixteen of the wood. The extract is readily soluble in warm water, and affords a richer dye than can be obtained from the wood of commerce. It is well deserving the attention of manufacturers.

Ibid.

Lucifer Matches.—The following mode of making these is very simple, and much less dangerous than other plans in use:—Take of chlorate of potash twelve parts, sulphuret of antimony four parts, animal glue or gum tragacanth three parts, and as much water as will suffice to bring the mixture to the consistence of a thick paste. The sulphuret of antimony is to be pulverised first, and the water with the glue or gum in solution added to it and well incorporated, when the chlorate of potash is to be gradually added. The antimony and chlorate must never be rubbed together in a dry state, as an explosion would be the result. The matches which are to be plunged in this paste, should be previously dipped about six or eight lines of their length into melted sulphur. The paper which is used to inflame them, is made by coating strong paper with fish glue, and covering this with a layer of very finely pulverised glass.

Memorial Encyclop.

Properties of Codeine.—From experiments made on animals, Mr. Kunkel concludes:—1st, that the action of codeine differs from that of morphine, in not paralysing the posterior extremities, and that the salts of morphine, and morphine itself have no other effects than those of a stupefying character; 2d, that codeine, on the contrary, appears to possess a very marked exciting power; it causes convulsions in the limbs and muscles of the neck; and when it causes death, it evidently exercises its chief action on the cerebellum and spinal marrow, which are found gorged with blood, the animal before its death always moving backwards. Codeine affects the organs of circulation, inflames the parts with which it comes in contact, acts more powerfully when introduced into the cellular tissue than into the stomach; is absorbed, and finally would seem to enjoy a special action on the urinary organs, suspending the excretion of urine; 3d, its action differs from that of the watery extract of opium, in not paralysing the lower limbs, but is analogous to it, in being more energetic on the cellular tissue than on the stomach, and in accelerating respiration and circulation.

Revue Medicale.



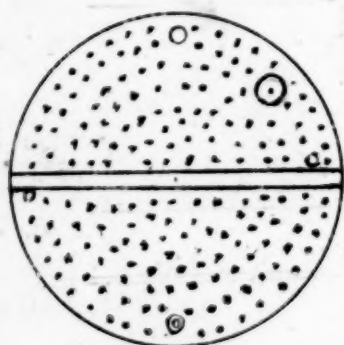
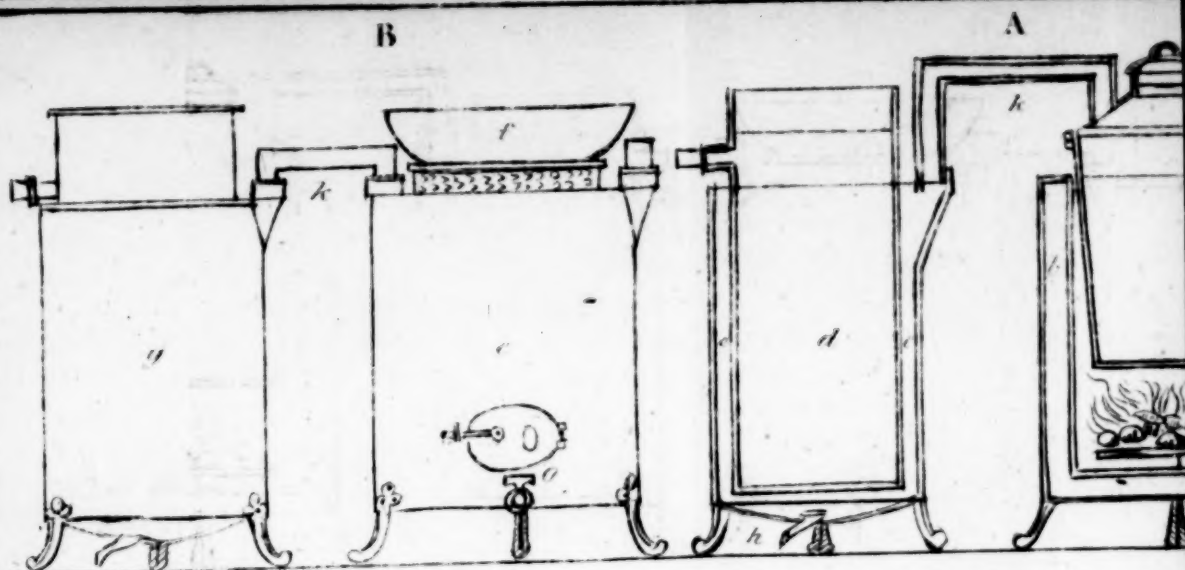


Fig. 5.

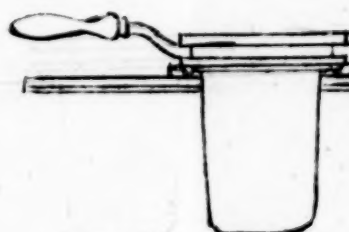


Fig. 8.

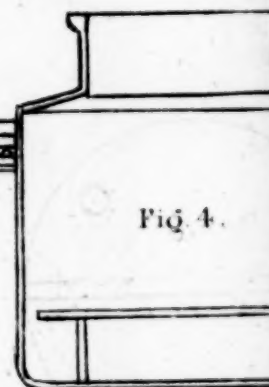


Fig. 4.



Fig. 9.

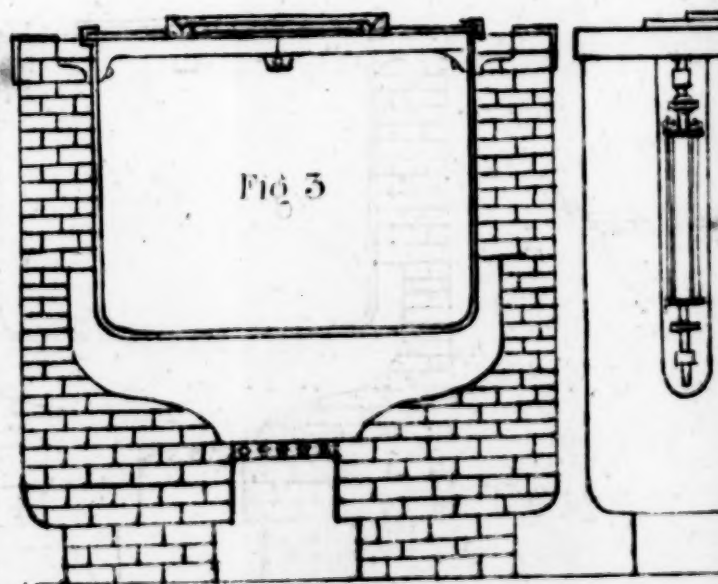


Fig. 3.

B

A

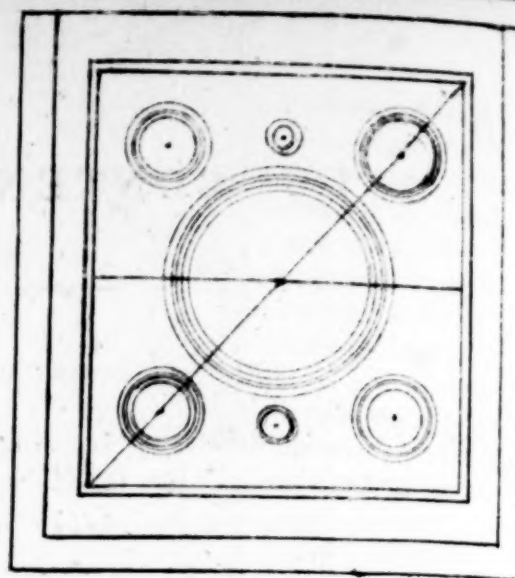
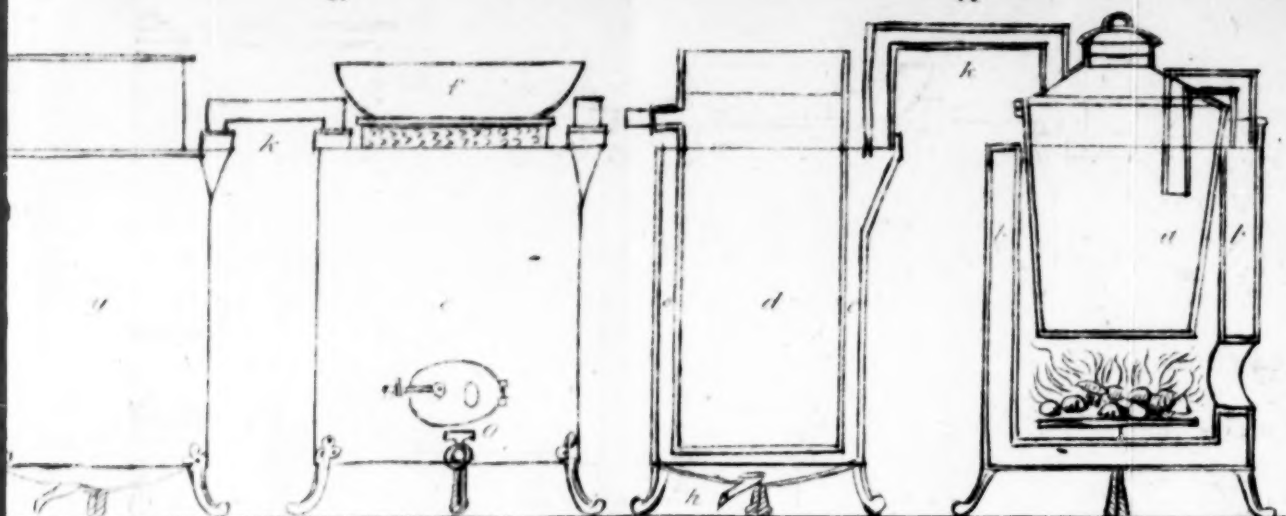


Fig. 1

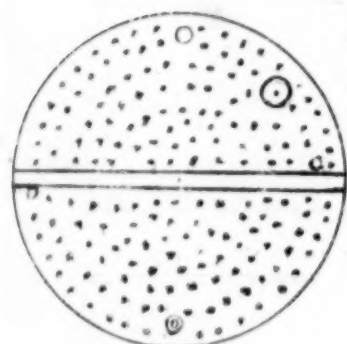


Fig. 5

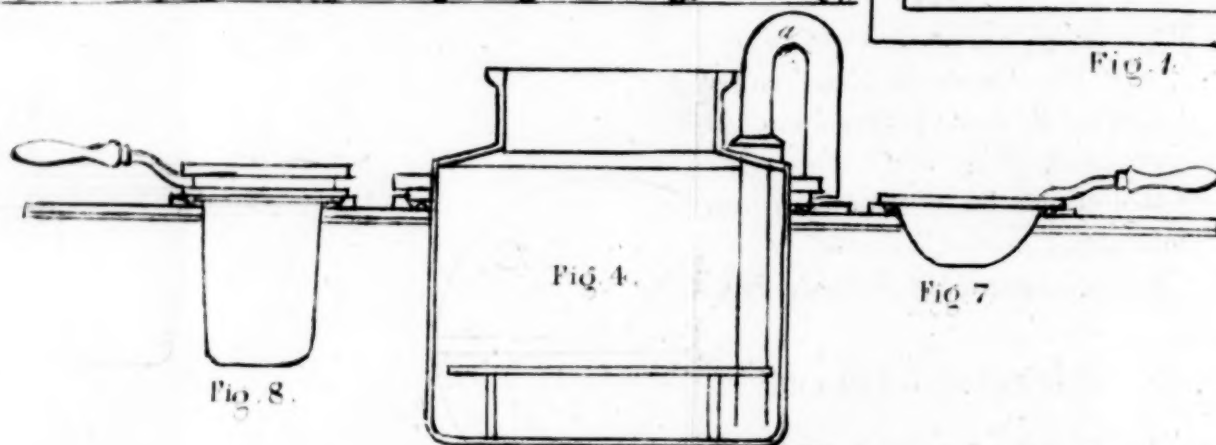


Fig. 4.

Fig. 7

Fig. 8.



Fig. 9.

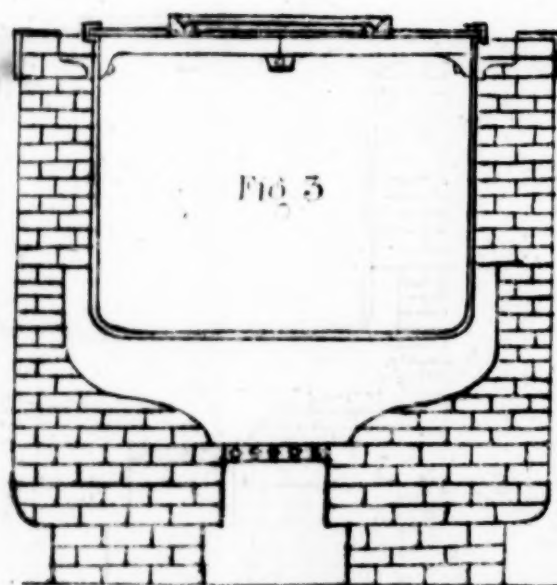


Fig. 3

Fig. 2

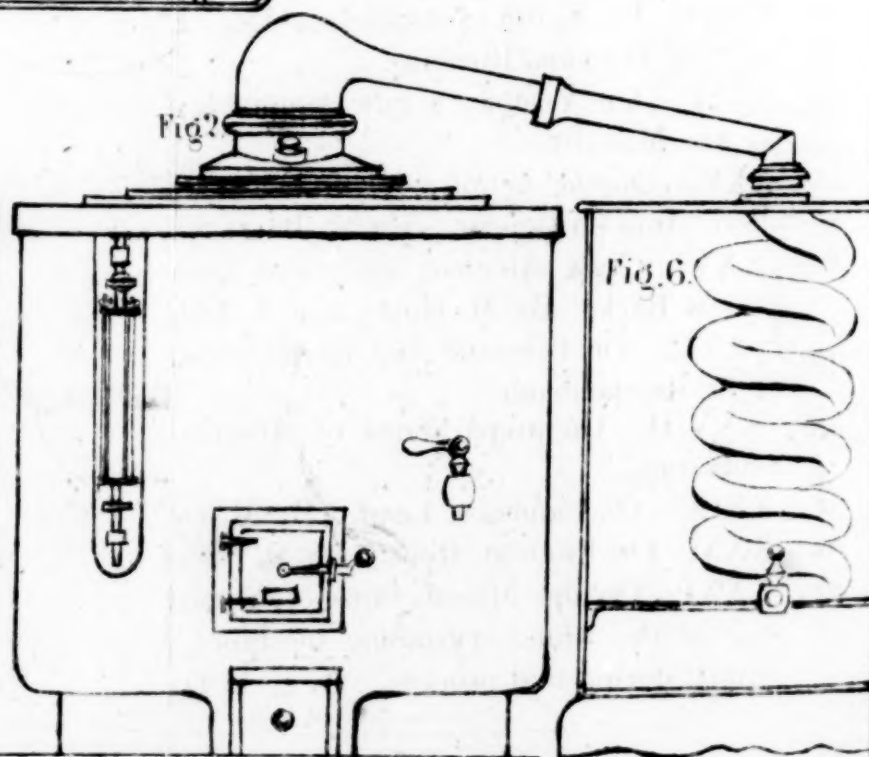


Fig. 6.